Water & Sewage Works

Index, Vol. 109, January-December, 1962

NUMBER	PAGES
January	1-46
February	47-86
March	87-126
April	127-166
May	167-206
June	207-246

Note

1—For Index to Reference and Data Material, see November 30, 1962 Issue, Page R-508.

2—Reports on conventions are listed under "Conferences," "AWWA," and "WPCF."

NUMBER	PAGES
July	247-286
August	287-326
September	327-366
October	367-406
November	407-446
December	447-486

Activated Sludge

Phosphorous and The Activated Sludge Process ..431

Analytical Methods

Application of Conductivity Measurements to Water & Waste Treatment 63
Coliforms Determined by Surface Plating Technique (Research Progress Report) 146
Present Status of the Coliform Test 277
Measurement of E. Coli Type L. by the Membrane Filter (Research Progress Report) .289
Polarographic Determination of Metals in Water, Wastes and Biological Samples 338
Bioassay for Algicidal Chemicals in Swimming Pools 361
Continuous Do Recording in Activated Sludge ..376
Sludge Gas Analysis Using Gas Chromatography-Part 1 468

AWWA

AWWA Visits Philadelphia 208
33rd Annual Meeting—Southeastern Section, AWWA 364
Michigan Section AWWA 23rd, Annual Meeting 442
South Dakota Holds Joint Meeting 477
11th Annual Water Works Management Short Course 478
27th Fall Meeting, New Jersey Section AWWA ..480

Certification

Mandatory Certification 459

Chemical Feed

Cationic Organic Coagulants in Waste Treatment 342

Chlorination

Should Small Water Supplies be Superchlorinated?-Part 2 21

Conferences

Water Pollution Control Advisory Board Meeting 205
Louisiana Short Course Holds Twenty-Forth Annual Meeting 260
Advanced Waste Treatment Research Seminar ..350
Annual Eastern Water Co. Conference Meeting ..479

Construction

Staunton Virginia Plant Expansion 38
Storm Drain Project Overcomes Construction Obstacles 57
A Sewage Treatment Plant for Helena, Montana 78
Water & Sewer River Crossings 81
Sewers in Air, Water & Earth..Part 1 132
Sewers in Air, Water & Earth..Part 2 181
Sewers in Air, Water & Earth..Part 3 250
Unique Headquarters for Engineering Firm....172
Bull Rull Dam No. 2 198
Outfall Sewer Construction—Paris Practices ..261
Interceptor to Serve New D. C. Airport 270
Maryland County Builds a Sewage Treatment Plant 295
Yes, You are an Inspector 347
Scaffold Speeds Pipeline Construction 356
Suspended Sewer Solves Problem 360
Ingenuity Simplifies Sewer Construction 438
Forming Aids STP Addition 444
Concrete Forming Efficiency 485

Corrosion Control

Sydney's Water Board Installs Corrosion Test Plant 60
Corrosion Defeated by Improved Control Method 160
Prestressing Water for Corrosion Control 305

Design

Design of Small Dams on Okinawa 17
Suburban Community Solves its Sewage and Water Problems 30
Storm Drain Project Overcomes Construction Obstacles 57
Horizontal Submersible Pumps 74
A Sewage Treatment Plant for Helena, Montana 78
Design Features of London's Northern Outfall Works 84
Municipality & Industry Combine to Solve Hydrogen Sulfide Problem 91
Automation for the Boy Scouts 108
A Two-Dimensional Slide-Rule for Hydraulic Calculations 114
Sewers in Air, Water & Earth..Part 1 132
Sewers in Air, Water & Earth..Part 2 181
Sewers in Air, Water & Earth..Part 3 250
Dry Bulk Chemicals in Sewage Treatment 142
Concepts of Sedimentation Applied to Design Part 1 162
Concepts of Sedimentation Applied to Design Part 2 169
Concepts of Sedimentation Applied to Design Part 3 257
Bull Rull Dam No. 2 198
Electrical Equipment for Sewage Treatment Plant Part 1 200

Electrical Equipment for Sewage Treatment Plant Part 2 214
Electrical Equipment for Sewage Treatment Plants Part 3 253
More Water for Greensboro, N. C. 229
Outfall Sewer Construction—Paris Practices .. 261
Electronic Computers in Water Utility Applications 302
Screenings Chamber Electrification 310
Design of Special Slide Rules 320
P.F.T. Pearth Multipoint Gas Recirculation ... 382
Medical Research Center Uses Backflow Preventers 428
Graphic Storm Sewer Design 447
Elevated Versus Ground Water Storage 464

Digestion

Operating an Anaerobic Digester 106
Scum Identification 107
Digester Operation-Solids Balance & Scum Formation 136
Effect of ABS on Digester Performance 373
P.F.T. Pearth Multipoint Gas Recirculation 382

Disinfection

Should Small Water Supplies be Superchlorinated? Part 2 21

Editorials

As The Year Begins—Editorial 40
Rating Bureau Surveys—File and Forget? —Editorial 126
Motor Boats for Oxidation Ponds—Editorial .. 166
Research Needs—Editorial 246
Points to Ponder—Editorial 286
NEEDED: Complete Treatment Evolution and Application—Editorial 366
Sanitary Engineers Need Salesmanship—Editorial 404
Pollution Abatement Progress—Editorial 446

Extended Aeration

Theory of the MAS Waste Treatment Process (Research Progress Report)..Part 1 53
Theory of the MAS Waste Treatment Process (Research Progress Report)..Part 2..... 97

Flow Measurement

Sewer Depth of Flow Determination 103

Insecticides

Pollutional Effects of Agricultural Insecticides and Synthetic Detergents 352

Instrumentation

Automation for the Boy Scouts 108
The "Space Age" Sewage Treatment Plant 150
Remote Intermittent Reservoir Level Reading .. 462

Lagoons

Rotor Aeration of Oxidation Ditches 238

Lime Sludge Calcination

Math Helps in Calciner Operation 178
Linear Programming of a Line Kiln 225
Beneficiation Helps Lime Sludge Calcination Part 1 332
Beneficiation Helps Lime Sludge Calcination Part 2 370

Maintenance

Development of an Epoxy Coating System for Water Tanks 117
Water Tank Painting—Recommended Specifications 203
Epoxy Tank Coatings 274
Steel Tank Coatings 329

Meters

Upstream Effects on Open Channel Outfall Meters 120

Nomographs

Pumping Warm Water 326
Friction Loss in Cast Iron Pipe 359
Densities of Sea Water Concentrates 430

Odor Control

Municipality & Industry Combine to Solve Hydrogen Sulfide Problem 91
Ozone for Treatment and Pollution Problems 167
$KMNO_4$ Improves Water Quality 266

Photographic Review

Annual Review 1

Pipe

The Past, Present & Future of Plastic Pipe 50
Water & Sewer River Crossing 81
Service Test of Bituminized Fibre Pipe 175
Scaffold Speeds Pipeline Construction 356
Piping Extraordinaire 440

Planning

Long-Term Planning for Water Utilities 138
Governor's Conference on Metropolitan Problems 156

Pollution

Oligochaetes as Indicators of Pollution 40
Pollutional Effects of Agricultural Insecticides and Synthetic Detergents 352
Oligochaetes as Indicators of Pollution 387
Oxygen Data Collection from Rivers 391
British Research on Aeration at Weirs 395
Measurement of Organic Pollutants 420
Stream Plankton Data Presentation 474

Pumps

Horizontal Submersible Pumps 74
Carbides Superiority for Bearing-Journal Material Demonstrated 211
Non-Clog Pumps—Versatile and Rugged 269
Sewage Pumping Station Uses Variable and Constant Speed Pumps 283
New Sewage Lift Station Concept 397
Non-Clog Pump is Self Priming 403
Facts About Pump Motor Bearings 435
Unique Vertical Pumps 482

Radioactivity

Natural Radioactivity in Ground Water..Part 3.. 25

Research Progress Report

Theory of the MAS Waste Treatment Process (Research Progress Report)..Part 1 53
Theory of the MAS Waste Treatment Process (Research Progress Report)..Part 2 97
Coliforms Determined by Surface Plating Technique (Research Progress Report) 146
Measurement of E. Coli Type L. by the Membrane Filter (Research Progress Report) 289

Saline Water

Sea Water Conversion Plant Uses Cornell Process 44
Electrodialysis Costs 87
Desalted Water for Bahrain Island Bottler 265

Sewage

Smoke Testing in a Sewage System 42
Ontario Provides Excellent Laboratory Services for its Water Resources Commission 70
Water & Sewer River Crossings 81
Sewer Depth of Flow Determination 103
Ozone for Treatment and Pollution Problems 167
Food Wastes Disposers—Their Effects on the Sewer System 220
Sewage Pumping Station Uses Variable and Constant Speed Pumps 283
New Sewage Lift Station Concept 397
Non-Clog Pump is Self Priming 403

Sewage Treatment

Theory of the MAS Waste Treatment Process (Research Progress Report)..Part 1 53
Theory of the MAS Waste Treatment Process (Research Progress Report)..Part 2 97
Dry Bulk Chemicals in Sewage Treatment 142
Rotor Aeration of Oxidation Ditches 238
Home Made Foam Control Device 273
Single Premise Disposal System 323
Cationic Organic Coagulants in Waste Treatment 342
Continuous DO Recording in Activated Sludge 376

Sewage Works

Annual Review 1
Suburban Community Solves its Sewage and Water Problems 30
Staunton Virginia Plant Expansion 38
A Sewage Treatment Plant for Helena, Montana 78
Design Features of London's Northern Outfall Works 84
Municipality & Industry Combine to Solve Hydrogen Sulfide Problem 91
The "Space Age" Sewage Treatment Plant 150
Denver Metro Sewage Project 158
Concepts of Sedimentation Applied to Design Part 1 162
Concepts of Sedimentation Applied to Design Part 2 169
Concepts of Sedimentation Applied to Design Part 3 257
Electrical Equipment for Sewage Treatment Plant Part 1 200
Electrical Equipment for Sewage Treatment Plants Part 2 214
Electrical Equipment for Sewage Treatment Plants Part 3 253
Maryland Country Builds a Sewage Treatment Plant 295
New Sewage System the Result of Co-operation 299
Screenings Chamber Electrification 310
Turbine Aerators Aid Plant Conversion 331
Landscaping Sewerage Installations 367
Grit Removal 405
Suburban Sewerage Scheme 425
Forming Aids STP Addition 444
Sewage Disposal and the Sea in Southern California..Part 1 452
New Addition to Phoenix, Arizona 483

Sewers

Sewers in Air, Water & Earth—Part 1 132
Sewers in Air, Water & Earth—Part 2 181
Sewers in Air, Water & Earth—Part 3 250
Drainage for New York World's Fair Site 189
Desposition in a Sanitary Sewer 192
Outfall Sewer Construction—Paris Practices 261
Interceptor to Serve New D. C. Airport 270
Southern California—Suburbia Exemplified 345
Suspended Sewer Solves Problem 360
Ingenuity Simplifies Sewer Construction 438
Graphic Storm Sewer Design 447

Sludge

Operating an Anaerobic Digester 106
Scum Identification 107
Digester Operation-Solids Balance & Scum Formation 136
The Bacteriology of Vacuum Filtered Raw Sludge 152
Exploration of Sludge Adsorption of Syndets 183
Direct Filtration Handles Packing House Waste 191
Sludge Dewatering Problem Solved 242
Effect of ABS on Digester Performance 373
P.F.T. Pearth Multipoint Gas Recirculation 382
Continuous Centrifugal Treatment of Sewage Sludge 384
Sludge Gas Analysis Using Gas Chromatography Part 1 468

Synthetic Detergents

Exploration of Sludge Adsorption of Syndets 183
Home Made Foam Control Device 273
Pollutional Effects of Agricultural Insecticides and Synthetic Detergents 352
Effect of ABS on Digester Performance 373

Tanks

Development of an Epoxy Coating System for Water Tanks 117
Water Tank Painting—Recommended Specifications 203
Epoxy Tank Coatings 274
Steel Tank Coatings 329
Elevated Versus Ground Water Storage 464

Taste and Odor

Actinomycetes Studied as Taste and Odor Cause 76
$KMNO_4$ Improves Water Quality 266

Valves

Ball Valve Report 36
Butterfly Valve Actuators—Part IV 232

Wastes

Treatment Methods for Laundry Wastes 110
Unique Treatment Plant for North Georgia 325
Disposal Effects of Citrus By-Products Wastes ..410

Water Supply

Design of Small Dams on Okinawa 17
Natural Radioactivity in Ground Water—Part 3 25
Actinomycetes Studied as Taste and Odor Cause 76
Automation for the Boy Scouts 108
Windom, Minnesota Gets More Water 186
Bull Rull Dam No. 2 198
More Water for Greensboro, N. C. 229
Water for the Island of the Gods 336
The Fryingpan—Arkansas Project 457
Remote Intermittent Reservoir Level Reading ..462

Water Treatment

Should Small Water Supplies be Superchlorinated? Part 2 21
Corrosion Defeated by Improved Control Method 160
Prestressing Water for Corrosion Control 305
Progress in Technology of Water Filtration 315

Water Works

Annual Review 1
Suburban Community Solves its Sewage and Water Problems 30
Ball Valve Report 36
Improved Water Service 47
Developing the Golden Valley Water System 65
Development of an Epoxy Coating System for Water Tanks 117
MWD Salt Lake City Plant Embodies Flexibility in its Hugeness 122
Present Program for Improved Water Service ..127
Long-Term Planning for Water Utilities 138
Math Helps in Calciner Operation 178
Water Tank Painting—Recommended Specifications 203
Irvine Ranch—City Sized Water Problem 217
Linear Programming of a Lime Kiln 225
Lansing, Mich. Utility Has New Office Building ..247
Epoxy Tank Coatings 274
Baton Rouge, La. Water Works Company Advances 287
Electronic Computers in Water Utility Applications 302
Quality Water for Deerfield Beach, Florida 327
Steel Tank Coatings 329
Pomona Builds for the Future 407
Progress at Highland Park 416
Piping Extraordinaire 440
Elevated Versus Ground Water Storage 464
How Nebraska City Won 476

WPCF

WPCF Meeting Research Symposium 475
South Dakota Holds Joint Meeting 477

AUTHORS' INDEX

A

Anderson, Kenneth H. 198
Ayres, Robert C. 205

B

Backmeyer, David (*with* Drautz, K. E.) 91
Ballinger, Dwight G. (*with* Hartlage, Thomas A.) ..338
Barnhill, Kenneth G. 87
Barrett, John O. 107; 136
Banmann, E. Robert 21
Boege, R. A. 175
Brazaitis, A. J. 232
Bruckman, C. A. 203
Burbank, N. C. (*with* Edgerley, E. Jr.; Rychman, D.W.; and Tomlinson, H. D.) 420
Burns, Thomas F. (*with* White, William F.) 384

C

Cherry, Arnold K. 266
Chewning, A. J. 242
Chueh, Chun F. (*with* Grune, Werner N.) 468
Clark, Curtis M. (*with* Watson, K. S.) 220
Conway, Richard A. 342
Czarnecki, Reynold B. (*with* Shook, William M.; and Perriello, Robert C.) 152

D

Davis, D. S. 326; 359; 430
Dean, Charles H. 347
Delaney, John E. (*with* McCarthy, Joseph A.; and Grasso, Rosario J.) 289
Diehl, Charles H. 211
Dominy, Floyd E. 457
Dyment, Robert 57

E

Edgerley, E. Jr. (*with* Burbank, N. C. Jr.; Rychman, D. W.; and Tomlinson, H. D.) 420
Editorials 46; 126; 166; 246; 286; 366; 446
Ehrenfest, Paul 142

F

Feng, Tsuan Hua 183; 431
Fitzgerald, George P. 361
Foote, Herbert B. (*with* Taylor, Harvey) 78
Ford, Robert G. 138
Forrest, F. R. 397

G

Galizia, Frank J. 200; 214; 253; 310

Geinopolos, Anthony (*with* Katz, William J.; and Mancini, John L) 162; 169 257
Gelfer, D. H. 329
Goff, Fred G. 65; 156
Grasso, Rossario J. (*with* Delaney, John E.; and McCarthy, Joseph A.) 289
Greenberg, A. E. 474
Grindrod, J. 60; 261; 395; 425
Grossman, Mac 167
Grune, Werner N. 25
Grune, Werner N. (*with* Chueh, Chun F.) 468

H

Halmos, E. E. Jr. 38; 81; 270; 295; 438
Hartlage, Thomas A. (*with* Ballinger, Dwight G.) ..338
Hauenstein, Henry W. 30
Haw, Robert 462
Hewes, Harry 158
Hopkins, Edward Scott (*with* Spencer, William B.) 108
Hurst, W. D. 47; 127

K

Kalda, Don C. 477
Kally, E. 114
Katz, William J. (*with* Geinopolos, Anthong; and Mancini, John L.) 162; 169; 257
Keech, Donald K. 464
Klein, Stephen A. 373
Kidder, R. J. 63
Kubik, Adam W. 283

L

Langford, L. L. 382
Langworthy, V. W. 46; 126; 166; 246; 286; 366; 446
Larsen, William C. (*with* Randorf, G. A.) 74
Ledbetter, Joe O. 302; 404
Ling, J. T. 315
Livingstone, F. C. 336
Look, Edward H. 50
Ludwig, Harvey F. (*with* Stewart, Mervin J.) 53; 98
Ludwig, R. G. (*with* Stone, R. V.) 410

M

Maddox, Tony 325
Mallman, W. L. (*with* Peabody, Frank R.).....146
Mancini, John L. (*with* Geinopolos, Anthony; and Katz, William J.) 162; 169; 257
Mann, Robert D. 150
Mays, R. (*with* Raymond, D. A.) 17
McCrea, Walter H. 274
McCarthy, Joseph A. (*with* Delaney, John E.; and Grasso, Rosario J.) 289
McCauley, R. F. (*with* Raths, Charles H.) 192
Medkeff, Russell J. 120
Miller, Harry J. 44
Morris, Robert L. 76
Murray, W. Bruce 305

N

Nollac, Walter M. 345

P

Papp, Remig A. 229
Peabody, Frank R. (*with* Mallman, W. L.) 146
Perriello, Robert C. (*with* Czarnecki, Reynold B.; and Shook, William M.) 152
Poganski, Arthur L. 273
Poulsen, R. E. 416
Purdy, R. W. 391

R

Randorf, G. A. (*with* Larsen, William C.) 74
Raths, Charles H. (*with* McCauley, R. F.) 192
Raymond, D. A. (*with* Mays, R.) 17
Reese, William J. 160
Reid, George W. (*with* Varma, Man M.) 277
Reymonds, Tom D. 352
Richmond, Edwin L. 265
Rowntree, John B. 132; 181; 250
Rychman, D. W. (*with* Burbank, N. C. Jr.; Edgerly, E., Jr.; and Tomlinson, H. D.) 420

S

Scott, John C. 70
Shook, William M. (*with* Czarnecki, Reynold B.; and Perriello, Robert C.) 152
Shrivastava, H. N. 40; 387
Spade, James F. 110
Spencer, William B. (*with* Hopkins, Edward Scott) 108
Stacey, C. E. 42
Staff Report 1; 36; 122; 247; 459
Stevenson, Robert E. 452
Stewart, Mervin J. (*with* Ludwig, Harvey F.) ..53; 98
Stone, R. V. (*with* Ludwig, R. G.) 410
Sullivan, David L. 106
Sulzer, F. (*with* Westgarth, W.) 376

T

Tarrant, J. 320
Taylor, Harvey (*with* Foote, Herbert B.) 78
Tomlinson, H. D. (*with* Edgerley, E. Jr.; Burbank, N. C., Jr.; and Rychman, D. W.) 420

V

Varma, Man M. (*with* Reid, George W.) 277

W

Walker, Paul G. W. 238
Walter, Leo 84
Walters, Charles F. 323
Watson, K. S. (*with* Clark, Curtis M.) 220
Wayne, Myron A. 299
Westgarth, W. (*with* Sulzer, F.) 376
Wettach, William 117
Wheeler, L. J. 186
Whitcomb, C. F. Jr. 178; 225; 332; 370
White, William F. (*with* Burns, Thomas F.) 384
Wilging, Robert C. 103

Z

Zoellner, G. Z. 447

REFERENCE NUMBER INDEX 1958 through 1962

All subjects in this and previous issues are listed with the respective keys ('58), ('59), ('60), ('61), or ('62)

A

Accounting and Service Procedures (Modern) ('58) R-17
Water Distribution Loss ('62) R-89

Activated Silica
Water Plant Operation ('59) R-223

Activated Sludge
Activated Sludge ('59) R-340
Frothing Aeration Tanks ('58) R-295
General ('59) R-339
Mixing ('60) R-273
Process Control ('61) R-438
Process, Developments in..... ('58) R-288, ('60) R-261, ('61) R-340

Administrative Practices
See also Management
Accounting and Service Procedures (Modern) ('58) R-17
Billing, Monthly Water ('58) R-20
General ('61) R-11, R-16
Legal Problems, Water-Sewage Works ('58) R-31
Ordinances, Industrial Waste ('58) R-351
Service Extensions ('59) R-204, ('60) R-15
Water Plant Records ('58) R-22

Air Conditioning, Cooling Water ('62) R-195

Algae
Culture and Harvest ('61) R-316
Growth Rate ('61) R-328
Sewage Treatment ('62) R-273
Taste and Odor Cause ('62) R-138

Alkalinity
Equivalents ('59) R-470, ('60) R-438
Measurement in Water ('58) R-382
Relationship to pH ('58) R-386

Analytical Methods
BOD ('60) R-55, ('61) R-55, R-420, R-449, R-463
Chlorine Dioxide ('61) R-458
DO ('61) R-55
Gas Chromatography ('61) R-443, R-445
Membrane Filter ('61) R-432, R-460
Standard Methods ('61) R-432

Areas of Circles ('59) R-488

Automatic Control of Chemical Addition ('61) R-73

Automation ('58) R-69
pH Control ('61) R-439
Pump Control ('61) R-390
Supervisory Control ('61) R-65

B

Bearings ('62) R-191

Billing ('58) R-20, ('59) R-20

Bioassay ('62) R-227

Biological Oxidation ('58) R-287, ('61) R-316, R-328

Books and Reference Manuals ('58) R-9, ('59) R-6, ('60) R-7, ('61) R-7

Book Publishers ('58) R-9, ('59) R-9, ('60) R-10, ('61) R-10

Budget for Water Works ('59) R-16

Bulletins and Catalogs ('59) R-492, ('60) R-440, ('61) R-504

Butterfly Valves
Actuators ('61) R-41, ('62) R-40

C

Calculations of
Areas, Volumes & Surfaces ('61) R-493
Capacity, Cylindrical Tanks ('58) R-161, ('61) R-497
Capacity, Water, Rectangular Tanks ('58) R-392
Chlorine Costs ('58) R-208
Contents of Rectangular Tanks ('61) R-496
Hydraulics ('62) R-48
Pipe Routes, Economical ('58) R-379
Speed, Water and Sewage Flow ('58) R-393
Water Consumption, Per Capita ('58) R-116

Capacity Tables & Charts
Circular Sewers ('59) R-482
Cylindrical Tanks ('58) R-161, ('61) R-497
Rectangular Weirs ('59) R-478
V Notch Weirs ('59) R-487

Catalogs and Bulletins ('57) R-391, ('59) R-492, ('60) R-440, ('61) R-504

Charges
Service ('60) R-15

Charts
Air Flow in Pipes ('59) R-479
Feed Machines, Dry Chemicals.. ('58) R-83, ('61) R-499, ('62) R-440
Flow in Concrete Pipe ('59) R-480, ('60) R-421
Flow Measurement, Rectangular Channels.. ('58) R-390, ('59) R-481
Loss of Head ('60) R-424, ('62) R-436
Nomograph, Flow in Pipes ('58) R-388
Nomograph for Dry Chemical Feeds ('62) R-443
Orifice, Circular ('58) R-57
pH Alkalinity Relationship ('58) R-386
pH Zones ('59) R-471, ('60) R-439, ('62) R-441
Sludge Digestion Percent ('60) R-308, ('62) R-439
Speed, Water and Sewage Flow ('58) R-393
Weir Capacity, Rectangular.. ('59) R-478, ('60) R-426, ('62) R-434
Weir Capacity, V-Notch..... ('59) R-487, ('60) R-427, ('62) R-433

Chemical
Activated Carbon, Syndet Removal ('61) R-123
Activated Carbon, Taste & Odor Control ('58) R-201
Air Conditioning ('62) R-195
Coagulation ('61) R-173, R-207
Copper Sulfate, Root Control, Sewers ('58) R-255
Fluorides, Agents and Requirements ('58) R-233, ('61) R-102, R-158
Fluoridation ('59) R-275
Handling ('58) R-80, ('60) R-65, ('62) R-346
Liquid Alum ('58) R-89, ('60) R-76, ('61) R-77
Potassium Permanganate ('62) R-142, R-176

Chemical Feeding
Air Conditioning ('62) R-195
Automatic Control of ('61) R-73
Checking Chart for Dry ('58) R-83, ('60) R-90, ('61) R-499, ('62) R-440
Chlorine Handling and Storage ('59) R-95
Design and Operation ('59) R-106
Glassy Phosphates ('60) R-73
Hypochlorites ('60) R-172, ('61) R-216
Liquid Alum ('58) R-89, ('60) R-76
Liquid Chemical ('60) R-67
Nomograph for Dry ('62) R-443
Outline of ('58) R-80
Phosphate ('60) R-80
Potassium Permanganate ('62) R-142, R-176

Chemical Handling
('58) R-80, ('60) R-65, ('61) R-77, ('62) R-142, R-346

Chemistry & Bacteriology
BOD Test ('61) R-55, R-420, R-449
Boron ('62) R-423
Bromine ('62) R-425
Calcium, Magnesium & Total Hardness Determination.. ('60) R-385
Chloride Determination ('60) R-380
Chlorine Dioxide ('61) R-458
Coliform Results ('62) R-406
Coliforms Determined ('62) R-427
Conductivity ('62) R-404
DO ('61) R-55
Elementary Solution Equilibrium Chemistry ('61) R-454
Enterococci ('62) R-400
Gas Chromatography ('61) R-443, R-445
Hexavalent Chromium ('61) R-466
Measuring Coliforms ('61) R-426
Membrane Filter Technique ('61) R-432, R-460
M P N Coliform Index ('59) R-473, ('62) R-392
Organic Ring Test ('61) R-468
O R P Measurements ('61) R-61
Oxygen Dissolved in Water ('59) R-472
Radioactivity ('62) R-421
Raw Filtered Sludge ('62) R-333
Specific Conductance of Water ('60) R-402
Split Treatment ('62) R-170
Swimming Pool Disinfection ('61) R-415

Chlorination
Chlorination of Wastewater ('59) R-350
Chlorination of Water ('59) R-234
Control Nomogram ('58) R-301
Disinfection Objectives ('62) R-147
Hypochlorination ('60) R-172, ('61) R-216
Sewage ('57) R-291, ('58) R-299
Small Water Supplies ('62) R-161
Theoretical Aspects ('62) R-155
Water, Notes on ('58) R-206
W P N Coliform Index ('59) R-473

Chlorine
Cost Calculation ('58) R-208
Gas Masks ('58) R-209
Handling ('58) R-209
Safety ('58) R-209
Storage & Handling ('59) R-95

Circles, Area of ('59) R-488, ('60) R-430

Cleaning
Water Mains ('61) R-155

Coagulation
Activated Silica ('59) R-223, ('60) R-160
Aids ('60) R-164, ('61) R-173
Chemicals ('61) R-207
Chemistry ('59) R-218
Concepts ('62) R-118
Control of ('61) R-182
General Principles ('60) R-159, R-389
Liquid Alum ('58) R-89
Notes On ('58) R-85
Questions and Answers ('62) R-131
Theory of ('61) R-192, R-211
Water ('58) R-85, ('59) R-218

Collection
Loads on Conduits ('59) R-459
Sanitary Sewer Extensions ('59) R-302
Sewer Use Regulations by Municipal Ordinance ('59) R-296

Compressed Air
Application ..... ('58) R-107

Concentration of Impurities in Water ..... ('58) R-384

Construction
Drainage During ..... ('59) R-454
Excavation & Pipe Foundation ..... ('61) R-303
Loads on Ditch Conduits ..... ('59) R-459
New Water Supply ..... ('61) R-402
Ocean Front Sewer ..... ('61) R-308
Ocean Outfall ..... ('61) R-409
Sewage Lagoons ..... ('58) R-277
Sewers ..... ('59) R-461, ('62) R-238
Sewer, Hydraulic Crane ..... ('58) R-364
Sewer, Salt Lake City Experience ..... ('58) R-357
Storm Drains ..... ('62) R-364
Trenching Practice ..... ('59) R-466
Why Use Small Crane Shovels? ..... ('59) R-458

Control
Activated Sludge Process ..... ('61) R-438
Automatic Pump ..... ('61) R-390
Cetyl Alcohol for Evaporation ..... ('59) R-136
Chlorination Nomogram ..... ('58) R-301
Corrosion ..... ('58) R-96
Corrosion, Effective ..... ('58) R-97
Digestion with Gas Diffusion ..... ('59) R-368
Instrumentation ..... ('60) R-88, ('61) R-65
Laboratory ..... ('58) R-101
Laboratory, Small Plant ..... ('60) R-98
Lime Kiln ..... ('62) R-29
Odor, Sewage Treatment ..... ('58) R-343
Ordinances, Industrial Waste ..... ('58) R-351
Roots in Sewers, Copper Sulfate ..... ('58) R-255
Sewage Lagoons ..... ('62) R-283
Simplicity of Systems ..... ('58) R-74
Sludge Digestion, CO_2 Alarm ..... ('58) R-313
Sludge Volume Index ..... ('60) R-95
Taste and Odor ..... ('59) R-227, ('61) R-458, ('62) R-142
Valves ..... ('61) R-47, R-165, ('62) R-40

Conversion
Factors ..... ('60) R-436, ('61) R-500
General ..... ('59) R-489

Cooling Water ..... ('62) R-195

Corrosion
Colored Water—Red, Black or Blue ..... ('59) R-112
Control ..... ('57) R-87, R-90, R-91, ('58) R-96, ('60) R-83, ('61) R-80
Effective Control ..... ('58) R-97
Fundamentals and Mitigation ..... ('58) R-96
Mechanism of Corrosion May Explain Problems ..... ('59) R-107
Sewage Works ..... ('61) R-311
Testing ..... ('60) R-84

Cost
Chlorine Calculations ..... ('58) R-208
Incineration, Sewage Solids ..... ('58) R-327
Pipe Routes, Economic, Calculation for ..... ('58) R-379
Safety ..... ('60) R-37
Seawater Desalting ..... ('61) R-97
Softening Municipal Water Supply ..... ('58) R-214
Synthetic Detergents ..... ('59) R-246
Water ..... ('61) R-226
Water Works ..... ('60) R-11

Counteraction, Sewage Odor ..... ('60) R-377

Customer Relations ..... ('59) R-33

Cylindrical Tank, Contents of ..... ('60) R-434, ('62) R-446

D

Data
Collection from Rivers ..... ('62) R-233
Technical General ..... ('58) R-381
Velocity in Pipes ..... ('59) R-486
Vital for Streams ..... ('59) R-290

Demineralization
Costs ..... ('61) R-97
Porous Membrane ..... ('60) R-156

Desalinization, Solar ..... ('62) R-81

Design
Activated Sludge Process ..... ('58) R-288
Bascule Gates ..... ('61) R-411
Butterfly Valve ..... ('59) R-201
Chemical Distribution Systems ..... ('59) R-106
Concepts of Sedimentation ..... ('62) R-118
Construction of Sewers ..... ('59) R-461, ('62) R-238, R-264, R-368
Digester Volume Requirements ..... ('61) R-353
Electrical Equipment ..... ('62) R-380
Excavation & Pipe Foundation ..... ('61) R-303
Extensions, Water Distribution Systems ..... ('58) R-127
Lift Station, Sewage ..... ('58) R-369
Liquid Alum Tank Lining ..... ('61) R-77
Loads on Ditch Conduits ..... ('59) R-459
Meter Maintenance Shop Layout ..... ('59) R-188
Oxidation Ponds ..... ('62) R-283
Open Channels ..... ('61) R-482
Pump Stations, Sewage ..... ('58) R-369
Pumping Warm Water ..... ('62) R-431
Sea Water Density ..... ('62) R-432
Soils Investigations for ..... ('62) R-356
Trickling Filter ..... ('58) R-281
Water Consumption, Factors in ..... ('58) R-116
Water Supply, Development in ..... ('58) R-123
Why Use Small Crane Shovels? ..... ('59) R-458

Detergents—See: Syndets

Determination of
Alkalinity in Water ..... ('58) R-382
Automatic Analysis for Silica & Hardness ..... ('59) R-116
Calcium, Magnesium & Hardness ..... ('60) R-385
Capacity, Cylindrical Tanks ..... ('58) R-161
Capacity, Water, Rectangular Tanks ..... ('58) R-392
Centrifugal Pump Efficiencies ..... ('58) R-38
Chloride ..... ('60) R-380
Coliform Counts, Membrane Filter ..... ('58) R-103, ('61) R-432
Dissolved Oxygen ..... ('59) R-119
Flow in Pipe ..... ('58) R-388
Flow, Rectangular Channels ..... ('58) R-390
Impurities in Water, Nomograph ..... ('58) R-384
Orifice Diameters ..... ('58) R-57
Pipe Flow, by Circular Orifice ..... ('58) R-66
Proper Size, Butterfly Valves ..... (58) R-173
Speed, Water and Sewage Flow ..... ('58) R-393

Dewatering Drying & Incineration
Asphalt Paved Sludge Beds, Salt Lake City ..... ('59) R-396
Filter Cloths ..... ('59) R-398
Metal Media Vacuum Filters for Sludge Dewatering ..... ('59) R-400
Sludge ..... ('60) R-318

Diatomaceous Earth Filtration ..... ('61) R-234, ('62) R-182

Differential Producers ..... ('59) R-76

Digestion
Alarm CO_2, Digester Operation ..... ('58) R-313
Control with Gas Diffusion ..... ('59) R-368
Digester Net Effective Capacity ..... ('59) R-372
Fundamentals of ..... ('61) R-363
Scum Identification ..... ('62) R-244
Sewage Sludge, Use of ..... ('58) R-338
Sludge ..... ('58) R-306, ('60) R-299
Sludge, Removal O_2 Demand, Supernatant Liquor ..... ('58) R-316
Sludge, Removal H_2S ..... ('62) R-315
Solids Balance and Scum ..... ('62) R-325
Volume Requirements ..... ('61) R-353

Directories
Manufacturers ..... ('59) R-509, ('60) R-454, ('61) R-544
Products ..... ('59) R-492, ('60) R-440, ('61) R-539
State Sanitary Engineers ..... ('59) R-4, ('60) R-5, ('61) R-5
State and Interstate Agencies ..... ('59) R-5, ('60) R-6, ('61) R-6

Disinfection
Hypochlorination ..... ('61) R-216
Objectives ..... ('62) R-147
Swimming Pool ..... ('61) R-415
Small Supplies ..... ('62) R-161
Theoretical Aspects ..... ('62) R-155

Disposal of
Sewage-Industrial Sanitary ..... ('62) R-279
Sludge ..... ('58) R-303, ('60) R-282
Solids ..... ('58) R-319
Solids, Sewage, Dried or Incinerated ..... ('58) R-321

Dissolved Oxygen
Collection from Rivers ..... ('62) R-233
Tidal Water Resources ..... ('61) R-296

Distribution System
Analyzers, Use of ..... ('62) R-53
Auxiliary Beacon Lights ..... ('59) R-185
Butterfly Valve Design & Application ..... ('59) R-201
Design Considerations ..... ('60) R-121
Efficient Design & Operation of Chemical ..... ('59) R-106
Elevated Tank Maintenance ..... ('59) R-169
Expanding and Improving Water Distribution Systems ..... ('59) R-141
Extensions to ..... ('58) R-127
Finding Sites for Elevated Tanks ..... ('59) R-161
Fire-Flow ..... ('61) R-470
Flow of Water from Hydrants ..... ('59) R-186
How to Increase Revenue Without Raising Water Rates ('59) R-191
Leakage ..... ('58) R-151, ('62) R-89
Loads on Conduits ..... ('59) R-459
Operation and Maintenance of ..... ('58) R-135
Plastic Pipe in Distribution System ..... ('59) R-196
Plastic Pipe for Water Services ..... ('59) R-159
Pressure Losses in Water Meters ..... ('59) R-193
Protection of ..... ('61) R-80
Safety During Cleaning ..... ('59) R-432
Service Extensions to Fringe Areas ..... ('59) R-204, ('60) R-137
Sizing Water Service Piping ..... ('59) R-175
"Slip-on" Joint Pipe ..... ('59) R-152
Supervisory Control ..... ('61) R-65
Underground Surveys ..... ('59) R-428

Dosage Control
Potassium Permanganate ..... ('62) R-142

E

Electrical Equipment ..... ('60) R-46, ('62) R-380

Electricity
Plant ..... ('59) R-68
Relay Test, Motor Protection ..... ('58) R-53
Tripping Power Circuit Breakers ..... ('61) R-24

Elutriation of Sludge ..... ('60) R-318

Engine Operation ..... ('62) R-331

Equipment
Color Coding-Identification ..... ('58) R-229
Crane, Hydraulic ..... ('58) R-364
Laboratory Still ..... ('61) R-467
Questions to ask before acquiring ..... ('61) R-14

Evaporation Suppression Research ..... ('61) R-138

F

Feeding Devices
Automatic Control of Chemical Addition ..... ('61) R-72
Chemical, Dry, Checking Chart ..... ('58) R-83
Handling, Chemicals ..... ('58) R-80
Hypochlorite ..... ('61) R-216

Fertilizer
Sewage Sludge as Soil Conditioner ..... ('59) R-403

Filter
Bottom, Porous Plate ..... ('58) R-191
Cloths ..... ('59) R-398
Diatomaceous Earth ..... ('61) R-234
Instruments ..... ('59) R-80
Measuring Coliforms ..... ('61) R-426
Membrane Technique ..... ('61) R-460
Metal Media Vacuum ..... ('59) R-400
Microstraining ..... ('62) R-184
Oil on Sludge Gas Engines ..... ('59) R-425
Operating Characteristics of ..... (59) R-261
Rapid Sand ..... ('60) R-199
Raw Sludge Bacteriology ..... ('62) R-332
Sewage ..... ('59) R-332, ('61) R-378
Trickling—See: Trickling Filters
Vacuum—See: Vacuum Filtration

Filtration
Diatomaceous Earth ..... ('61) R-234
Filter Bottoms, Porous Plate ..... ('58) R-191
Operating Characteristics of Rapid Sand Filters ..... ('59) R-261
Reversible Diatomite Filtration ..... ('59) R-368
Vacuum Diatomite ..... ('60) R-195

Financing
Financing Small Water Utilities in California ..... ('59) R-21
Financing Water Utilities in Michigan ..... ('59) R-24
Water Works ..... ('60) R-11

Fire Flow Slide Rule ..... ('61) R-470

Flow
Circular Sewers ..... ('59) R-482
Concrete Pipe Line ..... ('59) R-480
Fire ..... ('61) R-470
Loss of Head in Pipe ..... ('59) R-485
Measurement—See: Flow Measurement
Meter, Magnetic ..... ('58) R-64
Meter, Magnetic, Pressure Loss in ..... ('62) R-435
Open Channels ..... ('61) R-482
Pipe, Loss of Head, Nomograph ..... ('58) R-389
Rectangular Channels ..... ('59) R-481
Regulators ..... ('61) R-301
Resistance ..... ('60) R-407
Sewers, in ..... ('61) R-474, ('62) R-264
Sludge ..... ('61) R-485
Water, by Hydraulic Pumping Ram ..... ('58) R-391
Water in Concrete Pipe Lines ..... ('59) R-480, ('60) R-421

Flow Measurement
Air in Pipes ..... ('59) R-479
Concrete Pipe Line ..... ('59) R-480
Differential Producers ..... ('59) R-76
Fire ..... ('64) R-470
Loss of Head, Nomograph ..... ('58) R-389
Meter, Linear Output ..... ('61) R-28
Meter-Magnetic, Flow ..... ('58) R-64, ('60) R-147, ('61) R-490
Orifice Method ..... ('58) R-57
Pipe Circular Orifice ..... ('58) R-66
Pipe, Nomograph ..... ('58) R-388, R-389
Rectangular Channels ..... ('58) R-390
Unit for Sewage Flow ..... ('58) R-67
Upstream Effects on ..... ('62) R-22

Fluoridation
Application ..... ('61) R-158
Applied, Fundamentals of ..... ('58) R-233
Chemicals, Availability of ..... ('59) R-275
Zeolite Phenomena ..... ('61) R-102

Formulas
Manning's ..... ('60) R-397

Friction
Entrance Losses ..... ('59) R-484
Hydraulic Entrance Losses ..... ('59) R-484
Loss in Magnetic Flow Meter ..... ('61) R-490
Water in Pipes ..... ('59) R-483

Functional Operations ..... ('58) R-28, R-37, ('60) R-45

G

Gages
Pressure ..... ('61) R-68

Garbage
Food Wastes Disposers ..... ('62) R-310

Gas
Analysis by Gas Chromatography ..... ('61) R-443, R-445
Diffusion, Digestion Control ..... ('59) R-368
Engines, Maintenance ..... ('60) R-309
Engine Oil Filters ..... ('59) R-425
Engine Operation ..... ('62) R-331
Masks for Cl_2 Handling ..... ('58) R-209
Production, Sludge Digestion ..... ('58) R-306
Sludge Gas H_2S Removal ..... ('62) R-315
Sludge Gas Utilization at Aurora, Ill. ..... ('59) R-389
Utilization ..... ('61) R-376

Gate Valves
Hydraulic Powered ..... ('61) R-165

Grit
Compressed Air, Applications ..... ('58) R-107

Ground Water
Radioactivity in ..... ('62) R-409
Syndet Removal From ..... ('62) R-341
Synthetic Detergents in ..... ('61) R-109

Ground Water Resources
Location & Evaluation ..... ('60) R-107

H

Handling
Chemicals—See: Chemical Handling
Chlorine ..... ('59) R-95
Sludge ..... ('58) R-305
Solids, Sewage, Dried or Incinerated ..... ('58) R-321

Hardness, Automatic Analysis for ..... ('59) R-116

Head
Also See: Loss of Head
Capacity, Efficiency, Horsepower Relationships ..... ('61) R-477
Loss of, Pipe Flow, Nomograph ..... ('58) R-389, ('62) R-436

How To
Relay Test for Motor Protection ..... ('58) R-53

Hydrant
Flow of Water ..... ('59) R-186

Hydraulics
Chart of Loss of Head in Feet per 1000 Ft. of Pipe ..... ('59) R-485
Concepts of Sedimentation ..... ('62) R-118
Dye Test for Basin Performance ..... ('60) R-394
Entrance Losses ..... ('59) R-484, ('60) R-423, ('62) R-437
Flow in Circular Sewers ..... ('59) R-482
Flow Resistance ..... ('60) R-407
Flow and Depth in Channels or Conduits ..... ('60) R-417
Flow, Open Channels ..... ('61) R-482
Flow Velocity ..... ('61) R-474, ('62) R-438
Loss of Head in Pipe and Fittings ..... ('61) R-490
Pumping Ram, Use of ..... ('58) R-391
Pumping Warm Water ..... ('62) R-431
Rate of Flow in Rectangular Channels ..... ('59) R-481
Roughness Coefficient Measurement ..... ('60) R-397
Slide Rule For ..... ('62) R-48
Sludge Flow ..... ('61) R-485
System Analyzers ..... ('62) R-52

Hydrogen Sulfide in Sewers ..... ('61) R-311
Hydrogen Sulfide Removal from Sludge Gas ..... ('62) R-315

I

Incinerators, Sludge ..... ('60) R-328

Industrial Wastes
Chlorination ..... ('59) R-350
Industrial Wastes in Municipal Sewage Plants ..... ('59) R-443, ('61) R-11
Joint Industry & City ..... ('60) R-369
Ordinances, For Control of ..... ('58) R-351
Phenols & Sewage ..... ('60) R-374
Processes and Problems ..... ('60) R-368
Tastes and Odors ..... ('59) R-230
Total Oxidation Treatment ..... ('58) R-287
Treatment Operations ..... ('58) R-37

Instrumentation
Conductivity Measurement ..... ('62) R-404
Control ..... ('59) R-80, ('61) R-65
Instrumentation and Control in Water Treatment ..... ('59) R-82
Time Recorder-Totalizers at Sewage Lift Stations ..... ('59) R-94
Water Works ..... ('60) R-50

Introduction to Water & Sewage Works ..... ('58) R-63, ('59) R-3, ('60) R-3, ('61) R-3

Ion Exchange ..... ('60) R-186

Iron & Manganese Removal From Municipal & Industrial Water Supplies ..... ('59) R-252, ('60) R-192
Potassium Permanganate Use ..... ('62) R-176

Iron Removal
Diatomite Filtration for ..... ('62) R-182

J

Joints, Sewer Pipe, Resistance to Tree Roots ..... ('58) R-261

Joints "Slip-On" ..... ('59) R-152

L

Laboratory
Alkalinity Equivalents ..... ('62) R-442
Alkalinity, Measurement in Water ..... ('58) R-382
Automatic Analysis for Silica & Hardness ..... ('59) R-116
Boron in Sewage ..... ('62) R-423
Bromine in Water ..... ('62) R-425
Coliform Evaluation ..... ('62) R-392
Coliform Results, Meaning of ..... ('62) R-406
Coliforms Determined ..... ('62) R-427
Con. ol ..... ('58) R-101, ('60) R-88, ('61) R-453, R-466
Control BOD and DO ..... ('61) R-55
Dissolved Ovygen Determination ..... ('59) R-119
Measuring Coliforms ..... ('61) R-426
Membrane Filter Procedure ..... ('58) R-103
Methods ..... ('60) R-100
Methods, Membrane Filter ..... ('61) R-432
O R P Measurements ..... ('61) R-61
pH-Alkalinity Relationships ..... ('58) R-386

Radioactivity ('62) R-421
Water Still ('61) R-467

Lagoons ('61) R-328

Lagoons, Raw Sewage
Depth and Loading ('62) R-283

Leaks
Distribution System Loss ('62) R-89
Water Distribution Systems ('58) R-151

Legal Problems, Water-Sewage Works ('58) R-31
Legal Aspects of Stream Pollution ('59) R-35
Municipal Water Rates ('60) R-25
Sewer Ordinance ('62) R-19
Water and Other Natural Resources ('59) R-39

Lime
Calciner Operation ('62) R-37
Calcining Kiln Performance ('62) R-29
Calcining Kiln Programming ('62) R-25

Loading
Sewage Lagoons, B.O.D. ('58) R-277

Loss of Head
Entrance ('59) R-484
Pipe ('60) R-424

M

Mains
Cleaning and Lining ('61) R-155

Main Line Metering ('59) R-78

Maintenance
Elevated Tanks ('59) R-169
Gas Engines ('60) R-309
Maitnenance Painting Procedures ('59) R-125
Meter Shop Layout ('59) R-188
Plant, General ('58) R-111
Preventive ('60) R-204
Pump Bearing Journal ('62) R-191
Pump, Sewage ('59) R-314
Sewer ('60) R-353, R-359, ('61) R-311
Sewer System, Factors in ('58) R-340
Steel Water Tanks ('58) R-155, ('62) R-46
Tanks ('58) R-155
Water Distribution System ('58) R-135, ('61) R-80
Water Meters—Repair or Replace ('58) R-183

Management
Also See: Administration
Billing, Monthly Water ('58) R-20
Effective Management Through Organization ('59) R-15
Engineering Report Concept ('62) R-16
General ('61) R-11, R-16
Increase Revenue ('59) R-191
Legal Problems ('58) R-31
Philosophy of Managers ('59) R-10
Public Relations and ('58) R-25
Safety Rules, Basic Fifty ('58) R-35
Sewer Ordinance Fallacies ('62) R-19
Water Meters, Advantages of ('58) R-28
Water Plant Records ('58) R-22
Water Supply Development, Elements of ('58) R-123
Water Utility Planning ('62) R-12
Water Works ('59) R-27
Water Works Billing Department ('59) R-20
Water Works Budget ('59) R-16

Manganese Removal ('62) R-176

Manning's Formula ('60) R-397

Materials
Compound, Pipe Joint, Resistant to Tree Root ('58) R-261
Filter Bottom, Porous Plate ('58) R-191
Protective, Concrete Sewer Pipe ('58) R-247

Mathematics
Calciner Operation ('62) R-37
Pumping Warm Water ('62) R-431
Solubility & Percentage Saturation of Oxygen in Water ('59) R-491
Square Roots of Numbers ('59) R-488
Squares of Numbers ('59) R-488

Measurement
Alkalinity in Water ('58) R-382
Fire Flow ('61) R-470
Flow ('61) R-28
Flow, Rectangular Channels ('58) R-390
Sewage Flow, by New Unit ('58) R-67
Pipe Flow, by Circular Orifice ('58) R-66

Membrane Filter
Coliform Evaluation ('62) R-392
Determination of Radioactivity ('62) R-421
Measuring Coliforms ('61) R-426
Procedure, Discussion of ('58) R-103, ('61) R-432
Technique ('61) R-460

Metering
Main Lines ('59) R-78

Meters
Linear Output ('61) R-28
Magnetic Flow ('58) R-64, ('60) R-147, ('61) R-490
Magnetic Flow, Pressure Loss in ('62) R-435
Main Line, Selection ('59) R-78
Main Line ('59) R-78
Maintenance Shop Layout ('59) R-188
Propeller ('59) R-78
Repair and Replace, When to ('58) R-183
Upstream Effects on Open Channel ('62) R-23
Water, Advantages of ('58) R-28

Microstraining ('62) R-184

Miscellaneous
Availability of Fluoridation Chemicals ('59) R-275
Oil Filters on Sludge Gas Engines ('59) R-425
Our Changing Environment ('61) R-290
Pumping Bearing Journal Material ('62) R-191
Sewer Cleaning and Safety Measures ('59) R-432
Underground Photographic Surveys ('59) R-428

Municipal Service, Water Supply for ('58) R-12

N

Nomographs
Chlorination Control ('58) R-301
Concentration of Impurities, Water ('58) R-384
Dry Chemical Feed ('61) R-499
Flow from Hydrants ('59) R-186
Flow in Concrete Pipe Lines ('59) R-480, ('60) R-421
Flow in Pipe, Solving for ('58) R-388
Hydraulic Entrance Losses ('59) R-484, ('60) R-423
Losses in Water Meters ('59) R-193
Loss of Head in Pipe ('59) R-485, ('60) R-424
Oxygen Dissolved in Water ('59) R-472
Oxygen Solubility in Water ('58) R-385
Pipe Class Selection ('61) R-477
Pipe Flow, Head Loss ('58) R-389
Pipe Length, Equivalent ('60) R-428, ('61) R-491
Rectangular Channels ('59) R-481
Rectangular Tank Contents ('60) R-433
Shock Pressure, Water Hammer ('58) R-387
Solubility and Percentage Saturation ('59) R-491
Tank Capacity, Water, Rectangular ('58) R-392
Weir Capacity, Rectangular ('59) R-478, ('60) R-426
Weir Capacity, V-Notch ('59) R-487, ('60) R-427

O

Ocean
Sewer Project ('61) R-308
Tidal Water Oxygen Resources ('61) R-296
Wind Drift ('61 R-348

Odor
Control in Sewage Treatment ('58) R-343, ('61) R-346
Water—See: Tastes and Odors

Operation
Activated Sludge ('59) R-340
Activated Sludge Process ('58) R-288
B.O.D.'s for Plant ('61) R-463
Calciner ('62) R-37
Chemical Distribution Systems ('59) R-106
Digester, CO_2 Alarm ('58) R-313
Digester, Removal O_2 Demand, Supernatant Liquor ('58) R-316
Functional ('58) R-37, ('60) R-45
Gas Engines ('60) R-309, ('62) R-331
Lime Kiln Programming ('62) R-25
Management and Public Relations ('58) R-25
Meter Maintenance Shop ('59) R-188
Plant ('61) R-205
Plant Maintenance, General ('58) R-111
Primary Sedimentation, Sewage ('58) R-265
Pump, Sewage ('59) R-314
Sand Filter ('59) R-261
Sewage Lagoons ('58) R-277
Sewage Plant, Tips in ('58) R-347
Solar Stills ('62) R-81
Solids Incineration, Sewage, Cost of ('58) R-327
Split Treatment ('62) R-170
Trickling Filter ('58) R-281
Water Distribution System ('58) R-135, ('61) R-65
Water Works ('58) R-115, ('60) R-104

Ordinances, Industrial Waste ('61) R-11
Sewer ('62) R-19

Oxygen
Tidal Water Resources ('61) R-296

P

Painting
Maintenance Procedures ('59) R-125
Steel Water Tanks ('58) R-155, ('62) R-46
Tanks, Steel Water ('58) R-155, ('62) R-46
Per Capita Water Consumption, Factors in ('58) R-116

Personnel
Sewer Maintenance ('60) R-359

pH
Zones ('59) R-471, ('60) R-439

Pipe
Air Flow ('59) R-479
Bituminized Fibre ('62) R-269
Color Coding-Identification ('58) R-229
Concrete, Flow in ('59) R-480
Concrete, Protection of, H_2S Gas ('58) R-247
Corrosion Prevention ('61) R-80
Economic Routes, Calculation for ('58) R-379
Equivalent Length Nomograph ('61) R-491
Flow, Measurement, Nomograph ('58) R-389
Flow, Measurement With Orifice ('58) R-66
Flow, Resistance ('60) R-407
Foundations ('61) R-303
Friction of Water in ('59) R-483
Joints, Sewer, Resistance to Tree Roots ('58) R-261
Loss of Head, Nomograph ('58) R-389

Nomograph for Equivalent Lengths ..... ('60) R-425
Nomograph, Pipe Class ..... ('61) R-477
Plastic ..... ('59) R-196
Plastic for Water Services ..... ('59) R-159
Pressure, Shock, Nomograph for ..... ('58) R-387
Sizing Water Service Piping ..... ('59) R-175
"Slip-On" Joints ..... ('59) R-152
Velocity ..... ('59) R-486, ('60) R-422

Planning Water Service, Long Range ..... ('62) R-12

Planning Water Supply Resources ..... ('59) R-13

Plant Electricity ..... ('59) R-68

Pollution
Coliform Distribution ..... ('62) R-250
Coliform Evaluation ..... ('62) R-392
Enterococci ..... ('62) R-400
Indicators of ..... ('61) R-284
Oxygen Data Collection ..... ('62) R-233
Urban vs. Rural ..... ('62) R-213
Water, Research in ..... ('61) R-293

Pollution Control Agencies ..... ('58) R-8

Pollution Control and Water Supply ..... ('60) R-224

Pressure
Gages ..... ('61) R-68
Losses in Magnetic Flow Meters ..... ('61) R-490
Losses in Water Meters ..... ('59) R-193
Shock, Water Hammer, Nomograph for ..... ('58) R-387

Primary Treatment
See: Sewage Treatment, Sludge
Economical Lagoon System of Sewage Disposal ..... ('59) R-318
Sedimentation, Sewage, The Process of ..... ('58) R-265

Protective Coatings
Concrete Sewer Pipe, Against H_2S ..... ('58) R-247, ('61) R-311
Corrosion Control ..... ('58) R-97
Steel Water Tanks ..... ('62) R-46

Public Relations and Policy
Customer Relations ..... ('59) R-33
Odor Control, Sewage Treatment ..... ('58) R-343
Maintenance, Sewer System, Regard to ..... ('58) R-340
Management and ..... ('58) R-25
Promotion ..... ('60) R-23
Responsibility for Utility Relocation ..... ('59) R-30
Utility ..... ('60) R-19

Water Works Management ..... ('59) R-27

Pumping
See Also: Pumps
Automatic Control ..... ('61) R-390
Centrifugal Pumps ..... ('59) R-47
Field Testing of Centrifugal Pumps ..... ('59) R-56
General ..... ('59) R-46
Stations, Automatic Control of ..... ('58) R-69, ('61) R-22
Submersible Booster ..... ('58) R-43
Systems, Raw Sludges ..... ('59) R-364
Time Recorder-Totalizers ..... ('59) R-94
Warm Water ..... ('62) R-431

Pumps
Automatic Control ..... ('61) R-390
Bearing Journal Material ..... ('62) R-191
Booster, Submersible ..... ('58) R-43
Centrifugal ..... ('59) R-47
Centrifugal, Efficiency of ..... ('58) R-38
Field Testing of Centrifugal ..... ('59) R-56
General ..... ('59) R-46
Hydraulic Ram, Pumping by ..... ('58) R-391
Materials ..... ('61) R-238
Motor Protection, Relay Test ..... ('58) R-53
Sewage, Maintenance ..... ('59) R-314, ('61) R-396
Stations, Lift Sewage ..... ('58) R-369
Time Recorder—Totalizers ..... ('59) R-94
Vertical ..... ('61) R-249

R

Radioactivity
Determination of ..... ('62) R-421
Ground Water ..... ('62) R-409

Rates
Water and Sewage ..... ('58) R-15, ('60) R-15

Rates of Flow
Air in Pipes ..... ('59) R-479
Control Systems, Simplicity of ..... ('58) R-74
Rectangular Channels ..... ('58) R-390

Raw Sludge, Thickening ..... ('60) R-336

Recovery Characteristics of Differential Producers ..... ('59) R-76

Regulators, Sewage Flow ..... ('61) R-301

Remote Control ..... ('61) R-65

Removal
Immediate Oxygen Demand ..... ('58) R-316
Iron and Manganese ..... ('62) R-176
Manganese and Iron ..... ('62) R-176
Roots, Control in Sewers ($CuSO_4$) ..... ('58) R-255
Sewage Nutrient ..... ('62) R-273

Research
Sewage Sand Filter ..... ('61) R-378
Water Pollution ..... ('61) R-293

Reservoir
Bascule Gate ..... ('61) R-411

Reference Manuals and Books
..... ('58) R-9, ('59) R-9, ('60) R-7, ('61) R-7

S

Safety
Beacon Lights ..... ('59) R-185
Chlorine Handling ..... ('58) R-209
Costs Less ..... ('60) R-37
Gas Engine Operation ..... ('62) R-331
Gas Masks ..... ('58) R-209
Fifty Rules, Basic ..... ('58) R-35
Fifty Rules, Basic ..... ('58) R-35
Measures and Sewer Cleaning ..... ('59) R-432
Organizing a Safety Program ..... ('59) R-43
Water Works ..... ('59) R-42
Sewage Works ..... ('59) R-42, ('60) R-41

Saline Water Conversion ..... ('59) R-138, ('61) R-97
Saline Water Density ..... ('62) R-432
Solar Stills ..... ('62) R-81

Sanitary Engineers Directory, State ..('58) R-7, ('60) R-5, ('61) R-5

Secondary Treatment
See: Activated Sludge, Trickling Filters, Lagoons, and Sewage Treatments, Secondary
Activated Sludge ..... ('59) R-340
Algae Growth Rate ..... ('61) R-328
Filters ..... ('59) R-332
High-Rate Sewage Treatment ..... ('59) R-332
MAS Process ..... ('62) R-297

Sedimentation
Detention Time Test ..... ('61) R-200
Liquid Alum, Use of ..... ('58) R-89
Notes on ..... ('58) R-85, ('60) R-159, ('61) R-202
Sewage Treatment, The Process of ..... ('58) R-265

Sewage
Algae Growth ..... ('61) R-316, ('62) R-138, R-283, R-273
B.O.D. Test ..... ('61) R-420, R-449
Boron Determination ..... ('62) R-423
Chlorination ..... ('58) R-299
Chlorination Control ..... ('58) R-301
Disposal, Lagoon System ..... ('59) R-318
Effluent Composition ..... ('62) R-288
Enterococci in ..... ('62) R-400
Flow Measurement Devices ..... ('58) R-67
Flow Measurement Unit ..... ('58) R-67
Handling Technology ..... ('60) R-215
Laboratory Control ..('60) R-98, R-100, ('61) R-426, R-466, R-468
Lagoons, Depth and Loading ..... ('62) R-283
Nutrient Removals by Algae ..... ('62) R-273
Odor Counteraction ..... ('60) R-246, ('61) R-346
Our Changing Environment ..... ('61) R-290
Pump Bearing Material ..... ('62) R-191
Pumping, Automatic Variable Speed ..... ('60) R-342
Reclamation, for Re-Use ..... ('58) R-241
Regulators, Flow ..... ('61) R-301
Services, Rate Making ..... ('58) R-15
Sludge: See Sludge ..... ('59) R-403
Soil Conditioner ..... ('59) R-403
Solids, Combustion ..... ('60) R-328
Solids, Determining Suspended ..... ('60) R-91
Syndets in ..... ('61) R-117, R-285
Time Recorder-Totalizers ..... ('59) R-94
Treatment: See Sewage Treatment
Urban vs. Rural Pollution ..... ('62) R-213
Works: See Sewage Works

Sewage Treatment
Activated Sludge ..... ('59) R-340
Activated Sludge, Frothing ..... ('58) R-295
Activated Sludge Process ..... ('58) R-288, ('61) R-340, R-438
Automatic Control of Chemical Addition ..... ('61) R-73
Bulk Chemicals ..... ('62) R-346
Chlorination ..... ('58) R-299, ('59) R-350
Digester Control ..... ('59) R-368, ('62) R-325
Digester Net Capacity ..... ('59) R-372
Electrical Switch Gear ..... ('60) R-46
Filters ..... ('59) R-332, ('61) R-378
For Turnpike Service Areas ..... ('61) R-333
Functional Operation ..... ('58) R-37
Gas Utilization ..... ('59) R-389
High-Rate ..... ('59) R-322
Hydrogen Sulfide Removal ..... ('62) R-315
Hypochlorites ..... ('61) R-216
Incineration, Solids, Cost of ..... ('58) R-327
Industrial Plant ..... ('62) R-279
Industrial Wastes ..... ('59) R-443
Lagoons, Economical ..... ('59) R-318
Lagoons, the Method of ..... ('58) R-277
MAS Process ..... ('62) R-297
Metropolitan Facilities ..... ('59) R-230
Odor Control ..... ('58) R-343, ('60) R-246) ('61) R-346
pH Zones ..... ('60) R-439, ('62) R-441
Plant Operations, BOD's for ..... ('61) R-463
Plant Operation, Tips in ..... ('58) R-347
Primary Sedimentation, the Process of ..... ('58) R-265
Scum Identification ..... ('62) R-244
Sludge, as Fertilizer ..... ('58) R-338
Sludge Dewatering, Drying & Incineration ..('58) R-319, ('62) R-333
Sludge Digestion ..... ('58) R-306
Sludge Disposal ..... ('59) R-358, R-403
Sludge Flow ..... ('61) R-485
Sludge Handling ..... ('58) R-305
Sludge Pumping ..... ('58) R-364
Solids, Dried or Incinerated, Handling of ..... ('58) R-321
Stabilization Ponds, Design ..... ('60) R-249, ('62) R-283
Stream Pollution ..... ('59) R-292
Syndet Destruction ..... ('61) R-285
Total Oxidation Treatment ..... ('58) R-281
Trickling Filters, The Operation ..... ('58) R-281

Tripping Power Circuit Breakers ('61) R-24
Urban vs. Rural Pollution ('62) R-213
Vacuum Filtration—See: Vacuum Filtration
With Phenols ('60) R-374

Sewage Works
Accounting and Service Procedures (Modern) ('58) R-17
Books ('58) R-9
Collection System Maintenance ('58) R-340
Color Coding, Identification ('58) R-229
Commutator Maintenance ('60) R-356
Compressed Air, Applications ('58) R-107
Corrosion ('61) R-311
Crane, Hydraulic ('58) R-364
Effluent Reclamation ('58) R-241
Electrical Equipment ('62) R-380
Flow Regulators ('61) R-301
Introduction to ('58) R-3
Laboratory Methods ('60) R-100, ('61) R-426
Legal Problems ('58) R-31
Maintenance, Electrical ('60) R-362
Motor Protection, Relay Test ('58) R-53
Municipal, Industrial Wastes ('59) R-443
New Measuring Unit, Sewage Flow ('58) R-67
Ocean Outfall ('61) R-409
Operation ('60) R-211
Operation, Tips in ('58) R-347
Ordinances, Industrial Wastes ('58) R-351
Pipe Routes, Economic, Calculation for ('58) R-379
Pump Bearing Material ('62) R-191
Practices-Introduction ('58) R-3
Pumping, Automatic Variable Speed ('60) R-342
Pumping Lift Station Design ('58) R-369
Rate Making ('58) R-15
Soils Investigations ('62) R-356
Speed Chart, Sewage Flow ('58) R-393

Sewage Works Operations
Metropolitan Sewage Facilities ('59) R-280
Sewage Works in the United States ('59) R-288

Sewer
Bituminized Fibre ('62) R-269
Cleaning & Safety Measures ('59) R-432
Concrete, Protection Against H_2S ('58) R-247, ('61) R-311
Construction of ('59) R-461, ('62) R-368
Construction, Hydraulic Crane ('58) R-364
Construction, Salt Lake City ('58) R-357
Deposition in ('62) R-238
Flow in Circular ('59) R-482, ('62) R-264
Food Wastes Effects on ('62) R-310
Inspection ('60) R-234
Joints, Resistance to Tree Roots ('58) R-261
Maintenance ('60) R-353, R-241
Maintenance, Factors in ('58) R-340
Maintenance, Personnel, Tools & Equipment ('60) R-359
Ocean Front Project ('61) R-308
Regulations by Municipal Ordinance ('59) R-296
Root Control, with Copper Sulphate ('58) R-255
Sanitary Extensions ('59) R-302
Service Charges ('58) R-15, ('60) R-15
Television Inspection ('60) R-234

Sludge
Activated, The Process. ('58) R-288, ('60) R-268, ('61) R-340, R-438
Activated, Mixing ('60) R-273
Beds, Asphalt Paved ('59) R-396
Dewatering—Also see: Elutriation ('60) R-318
Dewatering, Metal Media Vacuum Filters ('59) R-400
Digester Volume Requirements ('61) R-353
Digestion ('58) R-306, ('60) R-299
Digestion, Fundamentals of ('61) R-363
Digestion, Percent ('60) R-308
Disposal ('58) R-303
Dried or Incinerated, Handling of ('58) R-321
Drying ('58) R-319
Elutriation ('58) R-319, ('60) R-318
Fertilizer ('58) R-338
Filter Cloths ('59) R-398
Flow Parameters ('61) R-485
Gas Engines, Oil Filter ('59) R-425
Gas Utilization at Aurora, Ill. ('59) R-389
Handling ('58) R-305
Incineration, Cost of ('58) R-327
Incinerators ('59) R-393
Pumping, Density Meter Control ('60) R-347
Raw, Vacuum Filtration ('60) R-287, ('62) R-333
Sludge Volume Index ('60) R-95
Syndet Adsorption of ('62) R-328
Thickening ('60) R-336
Utilization ('60) R-282, R-293

Sludge Digestion
Alarm, CO_2 ('58) R-313
Fundamentals of ('61) R-363
Gas Analysis ('61) R-443, R-445
Removal O_2 Demand, Supernatant Liquor ('58) R-316

Sludge Disposal
Sludge Disposal ('59) R-358
Pumping Systems ('59) R-364
Soil Conditioner ('59) R-403
Utilization ('60) R-282, R-293

Sludge Handling
Raw Sludge Pumping Systems ('59) R-364

Softening
Calcite in Water Treatment ('59) R-209
Municipal Water Supplies ('58) R-214
Regeneration of Ion-Exchange Softeners ('59) R-242
Synthetic Detergents as a Factor in Water Softening Economics ('59) R-246, ('61) R-226
Solubility of Oxygen in Water ('58) R-385
Split Treatment ('62) R-170

Source of Supply
Cetyl Alcohol for Evaporation Control ('59) R-136
Saline Water Conversion ('59) R-138
Radioactive Rains and Surface Water Supplies ('59) R-133

Specifications, Water Tank Painting ('62) R-46

Split Treatment ('62) R-170

Stabilization by Split Treatment ('62) R-170

Storage
Chlorine ('59) R-95

Stream Pollution
Bioassays for Pesticide Toxicity ('62) R-227
Biological Indicators ('61) R-281, R-284
Legal Aspects of ('59) R-35
Observations on Vital Data for Streams ('59) R-290
Oxygen Data Collection ('62) R-233
Research in ('61) R-293
Sewage Treatment ('59) R-292
Taste and Odor Caused by Actinomycetes ('62) R-138
Thermal Discharge ('60) R-228
Urban vs. Rural ('62) R-213

Surveys
Distribution Systems ('59) R-141, ('62) R-89
Extension, Water Distribution Systems ('58) R-127
Membrane Filter Procedure ('58) R-103
Sewer Flow ('62) R-264
System Analyzers ('62) R-53
Underground Photographic ('59) R-428

Syndets
Adsorption by Sewage Sludge ('62) R-328
Destruction in Sewage ('61) R-285
Factor in Water Softening Economics ('59) R-246
In Ground Water ('61) R-105, R-109
In Water and Sewage ('61) R-117
Laundry Wastes Treatment ('62) R-341, R-350
Removal by Activated Carbon ('61) R-123
Soaps—Softening Municipal Water Supplies ('58) R-214

T

Table of Contents. ('58) R-2, ('59) R-2, ('60) R-2, ('61) R-2, ('62) R-2

Tables
Alkalinity Equivalents ('59) R-470, ('62) R-442
Area of Circles ('59) R-488
Circles, Area of ('59) R-488
Conversion Factors ('62) R-444
Discharge—See: Discharge Tables
Friction of Water in Papes ('59) R-483
Square Root of Numbers ('59) R-488
Squares of Numbers ('59) R-488
Velocity in Pipes ('59) R-486, ('62) R-438
Weights and Measures ('62) R-445

Tanks
Activated Sludge, Frothing in ('58) R-295
Auxiliary Beacon Lights ('59) R-185
Cylindrical Contents of ('58) R-161, ('62) R-446
Cylindrical, Capacity of ('58) R-161, ('61) R-497
Elevated, Maintenance of ('59) R-169
Elevated, Protection of ('58) R-162
Elevated, Sites for ('59) R-161
Inspecting and Repainting ('58) R-155
Liquid Alum Lining ('61) R-77
Maintenance ('58) R-155
Maintenance & Cathodic Protection ('58) R-162
Painting Specifications ('62) R-46
Rectangular, Capacity of, Water ('58) R-392
Rectangular, Contents ('61) R-496, ('62) R-448
Steel Water, Repainting ('58) R-155

Taste & Odor
Actinomycetes Studied as Cause ('62) R-138
Control ('61) R-458
Control, Activated Carbon ('58) R-201
Control, Potassium Permanganate ('62) R-142
Taste and Odors in Water ('58) R-201
Taste and Odor Problems at Valparaiso, Ind. ('59) R-227

Television for Sewer Maintenance ('60) R-234

Tidal Waters
Oxygen Resources ('61) R-296
Wind Drift ('61) R-348

Treatment, Total Oxidation ('58) R-287

Trenching Practice ('59) R-466

Trickling Filters
Filter Fly Control ('60) R-265
Operation of ('58) R-281
Sewage Filters ('59) R-332
Tanks, Final Settling ('60) R-261
Theory ('60) R-256

U

Utilization
Gas ('61) R-376
Sludge ('60) R-282
Sludge, Topsoil Production ('58) R-338

Utility
Public Relations ('60) R-19

V

Vacuum Filtration
Digested Sludge ..... ('60) R-324
Metal Media ..... ('59) R-400
Raw Sludge ..... ('62) R-333
Sludge ..... ('58) R-303, ('60) R-287

Valves
Butterfly ..... ('58) R-173, ('61) R-41, ('62) R-40
Butterfly Design & Application ..... ('59) R-201
Control Systems, Simplicity in Use of ..... ('58) R-74
Hydraulic Powered ..... ('61) R-165
Selecting ..... ('58) R-173
Torque Characteristics, Butterfly ..... ('58) R-173

W

Waste Disposal
Odor Phase ..... ('60) R-377

Waste Treatment
Joint Industry and City ..... ('60) R-369
ORP Measurement ..... ('61) R-61

Waste, Water
Chlorination of ..... ('59) R-350

Water
Air Conditioning ..... ('62) R-195
Bromine Determination ..... ('62) R-425
Chemistry ..... ('58) R-85, ('61) R-468
Chlorination of ..... (59) R-350, ('62) R-161
Chlorination Control ..... ('58) R-301
Chlorination, Notes on ..... ('58) R-206
Chlorine Dioxide Determiantion ..... ('61) R-458
Coagulant Aids ..... ('61) R-173
Coagulation ..... ('58) R-85, ('61) R-211
Coagulation Chemicals ..... ('61) R-207
Coagulation, General Principles ..... ('60) R-389
Coagulation, Theory of ..... ('61) R-192
Colored ..... ('59) R-112
Consumption, Factors in ..... ('58) R-116
Demineralized ..... ('61) R-97
Disinfection Standards ..... ('62) R-147
Disinfection Theoretical Aspects ..... ('62) R-155
Distribution ..... ('60) R-120
Distribution Loss ..... ('62) R-89
Distribution System Protection ..... ('61) R-80
Enterococci in ..... ('62) R-400
Filtration, Diatomaceous Earth ..... ('61) R-234
Filtration, Vacuum Diatomite ..... ('60) R-195
Flow from Hydrants ..... ('59) R-186
Fluoridation—See: Fluoridation
Hammer, Shock Pressure, Nomograph for ..... ('58) R-387
Main Cleaning ..... ('61) R-155
Main Extensions ..... ('60) R-137
Measurement of Alkalinity ..... ('58) R-382
Membrane Filter Procedure ..... ('58) R-103, ('61) R-426, R-432
Membrane Filter Technique ..... ('61) R-460
Meters, Advantages of ..... ('58) R-128
Meters, Linear Flow ..... ('61) R-28
Meters, Losses in ..... ('59) R-193
Microstraining ..... ('62) R-184
Nomograph, Concentration of Impurities ..... ('58) R-384
Our Changing Environment ..... ('61) R-290
Oxygen Dissolved in ..... ('59) R-472
pH—Alkalinity Relationship ..... ('58) R-386
Pollution Research ..... ('61) R-293
Pumping ..... ('62) R-431
Pumping, by Hydraulic Ram ..... ('58) R-391
Radioactivity Determination ..... ('62) R-421
Radioactivity in ..... ('62) R-409
Rates ..... ('58) R-15, ('60) R-15
Reclamation of Sewage Effluents ..... ('58) R-241
Revenues ..... ('58) R-15
Sedimentation ..... ('61) R-200, R-202, ('62) R-118, R-131
Service Piping ..... ('59) R-175
Services, Plastic Pipe ..... ('59) R-159
Supply—See: Water Supply
Swimming Pool Disinfection ..... ('61) R-415
Syndets in ..... ('61) R-117
Taste and Odors in ..... ('59) R-230, ('62) R-138
Toxicity of Cadmium & Hexavalent Chromium ..... ('61) R-152
Treatment—See: Water Treatment
Utilities Billing ..... ('58) R-20
Waste Utilities Billing ..... ('58) R-20
Waste—See: Waste, Water
Water & Other Natural Resources ..... ('59) R-39
Zeolites, Fluoride Phenomena ..... ('61) R-102

Water Plant Records (are important) ..... ('58) R-22

Water Pollution
Bioassays ..... ('62) R-227
Coliform Distribution ..... ('62) R-250

Water Supply
Billing, Monthly ..... ('58) R-20
Demand, Future ..... ('61) R-17
Development, Elements of ..... ('58) R-123
Evaporation Supression Research ..... ('61) R-138
Insecticide Pollution ..... ('60) R-224
Inventory of 1956 Facilities ..... ('59) R-128
Location & Evaluation ..... ('60) R-107
Municipal Service ..... ('58) R-12
New Construction ..... ('61) R-402
Planning ..... ('58) R-12, ('62) R-12
Planning Resources ..... ('59) R-13
Pollution Indicators ..... ('61) R-284
Pollution Research ..... ('61) R-293
Radioactive Rains ..... ('59) R-133
Rate Making ..... ('58) R-15
Reverse Circulation Drilling ..... ('61) R-127
Syndets in ..... ('61) R-105, R-109
Toxicity of Cadmium & Hexavalent Chromium ..... ('61) R-152

Water Treatment
Activated Silica ..... ('59) R-223, ('60) R-160
Air Conditioning ..... ('62) R-195
Automatic Control of Chemical Addition ..... ('61) R-73
Calcite in Water Treatment ..... ('59) R-209
Chlorination ..... ('59) R-234, ('62) R-161
Coagulation Aids ..... ('60) R-164, ('61) R-173
Coagulation Chemicals ..... ('61) R-207
Coagulation, Theory of ..... ('61) R-192
Conductivity Measurement ..... ('62) R-404
Control of Coagulation ..... ('61) R-182
Cost of Chlorine, Calculation of ..... ('58) R-208
Demineralization ..... ('60) R-156, ('61) R-97
Diatomite Filtration ..... ('59) R-268, ('60) R-195, ('61) R-234
Disinfection Standards ..... ('62) R-147
Disinfection Theoretical Aspects ..... ('62) R-155
Filter Bottoms, Porous Plate ..... ('58) R-191
Fluoridation—See: Fluoridation
Fluoridation, Applied, Fundamentals of ..... ('58) R-233
Functional Operation ..... ('58) R-37, ('60) R-45
Hypochlorites ..... ('60) R-172
Instrumentation and Control in ..... ('59) R-82
Iron and Manganese Removal ..... ('58) R-222, ('59) R-252, ('60) R-192, ('62) R-176
Iron Removal ..... ('62) R-182
Liquid Alum, Use of ..... ('58) R-89, ('60) R-76
Microstraining ..... ('62) R-184
MPN Coliform Index ..... ('59) R-473
pH Zones ..... ('60) R-439, ('62) R-441
Pipe Protection ..... ('61) R-80
Rapid Sand Filters ..... ('59) R-261, ('60) R-199
Saline Water Conversion ..... ('59) R-138
Sedimentation ..('60) R-159, ('61) R-200, R-202, ('62) R-118, R-131
Softening—See: Softening
Softening of Municipal Water Supply ..... ('58) R-214
Solar Stills ..... ('62) R-81
Split Treatment ..... ('62) R-170
Syndet Removal ..... ('61) R-123
Taste & Odors ..... ('59) R-230
Taste & Odor Control, Activated Carbon ..... ('58) R-201
Taste & Odor Control, Potassium Permanganate ..... ('62) R-142
Taste & Odor Problems ..... ('59) R-227
Tripping Power Circuit Breakers ..... ('61) R-24

Water Works
Accounting and Service Procelures (Modern) ..... ('58) R-17
Automation ..... ('58) R-69
Billing Department ..... ('59) R-20
Books ..... ('58) R-9
Budget ..... ('59) R-16
Color Coding, Identification ..... ('58) R-229
Compressed Air in ..... ('58) R-107
Control Systems, Simplicity of ..... ('58) R-74
Corrosion Problems—See: Corrosion ..... ('58) R-96
Distribution System Analyzers ..... ('62) R-53
Distribution System Extensions ..... ('58) R-127
Distribution System Leakage ..... ('58) R-151, ('62) R-89
Distribution System, Operation-Maintenance ..... ('58) R-135, ('61) R-65
Distribution System Protection ..... ('61) R-80
Expanding and Improving Distribution Systems ..... ('59) R-141
Feeding Glassy Phosphates ..... ('60) R-73, R-80
Financing ..... ('60) R-15
Financing Small Water Utilities in California ..... ('59) R-21
Flow Measurement ..... ('58) R-64
Instrumentation ..... ('60) R-50
Introductory to ..... ('58) R-3
Inventory of 1956 Water Supply Facilities in Communities of 25,000 and Over ..... ('59) R-128
Laboratory Methods ..... ('61) R-426, R-458
Legal Problems ..... ('58) R-31
Library—See: Books
Liquid Alum Feeding ..... ('60) R-76
Liquid Chemical Feeders ..... ('60) R-67
Main Cleaning ..... ('61) R-155
Management ..... ('59) R-27
Meters, Linear Flow ..... ('61) R-28
Meters, Magnetic, Flow ..... ('58) R-64
Meters, Repair or Replacement ..... ('58) R-183
Methods of Financing Water Utilities in Michigan ..... ('59) R-24
Operations ..... ('58) R-115, ('60) R-104
pH Control ..... ('60) R-61
Pipe Class Selection ..... ('61) R-477
Pipe Flow Measurement ..... ('58) R-66
Pipe Routes, Economic, Calculation for ..... ('58) R-379
Plant Maintenance, General ..... ('58) R-111
Pumps, Booster Stations ..... ('58) R-43
Management and Public Relations ..... ('58) R-25
Plant Records ..... ('58) R-22
Practices—Introduction ..... ('58) R-3
Rapid Sand Filters ..... ('59) R-261, ('60) R-199
Rate Making ..... ('58) R-15
Responsibility for Utility Relocation ..... ('59) R-30
Safety—See: Safety
Service Extensions ..... ('59) R-204, ('60) R-137
Sites for Tanks ..... ('59) R-161
Soils Investigations for Projects ..... ('62) R-356
Speed Chart, Water Flow ..... ('58) R-393
Tank Painting Specifications ..... ('62) R-46
Theory ..... ('60) R-154
Underground Photography ..... ('59) R-428

Weir Capacity, Rectangular ..... ('60) R-426, ('62) R-434

Weir Capacity, V-Notch ..... ('59) R-487, ('60) R-427, ('62) R-433

Wells
Reverse Circulation Drilling ..... ('61) R-127

Z

Zeolites
Fluoride Phenomena ..... ('61) R-102

AUTHOR REFERENCE NUMBER INDEX—1958 through 1962

Adams, J. K., Cornish, M. S. & Zablarsky, H. R. ('60) R-268
Agnew, A. V. ('58) R-20
Ahrens, G. C. ('60) R-23
Albert, Paul McH. ('60) R-417
Amsbary, F. C. ('58) R-25, ('59) R-152
Annett, R. & Forman, L. ('60) R-98
Anwar, R. A., Hopert, C. A., & Byerrum, R. U. ('61) R-152
Armbrust, H. N. ('60) R-195
Ashenden, H. B. ('61) R-24
Assenzo, Joseph R. & Reid, George W. ('61) R-316
Aultman, W. W. ('58) R-214, ('59) R-246
Ayres, Louis E. ('59) R-24

Babcock, R. H. ('61) R-73
Babcock, R. H. & Knowlton, K. F. ('58) R-64, ('60) R-76
Bach, C. M. & Corlett, T. B. Jr. ('61) R-77
Backmeyer, D. & Drautz, K. E. ('62) R-315
Ball, A. I. ('60) R-164
Barlow, John P. & Myren, Richard T. ('61) R-296
Barnhart, E. & Eckenfelder, W. W. Jr. ('62) R-341
Barrett, E. D. ('59) R-160
Barrett, J. O. ('62) R-244, R-325
Barron, W. T. & Miller, Frank H. ('58) R-313
Baumann, E. R. ('62) R-163
Bean, Elwood L. ('61) R-182
Beard, C. S. ('58) R-74
Becker, H. S. & Keefer, C. E. ('61) R-396
Beckwith, Homer E. ('58) R-38
Behn, V. C. ('61) R-454
Beltz, Fred W. Jr. ('59) R-56
Bendixen, T. L., Thomas, H. A. Jr. & Coulter, J. B. ('60) R-215
Benedict, I. J. ('61) R-460
Bennett, Richard ('59) R-466
Bishop, Raymond F. ('59) R-191
Black, A. L. ('60) R-164
Black, A. P. ('59) R-218, ('60) R-164, ('61) R-192, R-415
Bloodgood, Don E. ('58) R-265, R-306, ('59) R-292, R-296, R-340, R-358
Boege, R. A. ('62) R-269
Bogan, R. H. ('62) R-273
Bolls, E. E. Jr. ('58) R-151
Borchardt, J. A. ('61) R-173
Boucher, P. L. & Evans, G. R. ('62) R-184
Boyce, Ernest ('59) R-39
Boudet, R. A. ('60) R-164
Braznitis, Abdon J. ('61) R-41, ('62) R-40
British Information Service ('61) R-376
Brown, J. ('60) R-324
Brown, Judson G. ('59) R-268
Brown, Walter H. ('59) R-82
Bruckman, C. A. ('62) R-46
Bubbis, N. S. ('60) R-356
Buffenmeyer, W. L. ('61) R-68
Bumstead, J. C. ('62) R-16
Burke, J. T. ('62) R-131
Burley, F. H. ('60) R-308
Busch, A. W. ('61) R-420
Bustard, W. B. ('60) R-362
Butrico, Frank A. & Hart, Russell W. ('61) R-290
Byerrum, R. U., Anwar, R. A. & Hoppert, C. A. ('61) R-152

Camp, T. R. & Culver, R. H. ('62) R-147
Campbell, T. N. ('60) R-164
Campenni, Louis G. ('61) R-109
Carroll, Leo ('60) R-147
Caster, Arthur D. ('60) R-234
Cerny, Josephine, Ebert, D. W. & Morris, R. L. ('61) R-102
Chamberlain, W. H. & Hatch, A. E. Jr. ('58) R-173
Chanin, Gerson ('61) R-370
Chanin, G., Hartmann, F. W. & Lollich, M. F. ('62) R-406
Clark, C. M. & Watson, K. S. ('62) R-310
Clark, H. F., Kabler, P. W. & Geldreich, E. E. ('58) R-103
Clark, J. W. ('60) R-55, ('61) R-463
Cleary, Edward J. ('59) R-290
Coote, Richard ('59) R-227
Corlett, T. B. Jr. & Bach, C. M. ('61) R-77
Cornish, M. S., Adams, J. K. & Zablatsky, H. R. ('60) R-268
Coulter, J. B., Bendixen, T. W. & Thomas, H. A. Jr. ('60) R-215
Crawford, L. K. ('59) R-461
Crits, G. J. ('61) R-468
Culver, R. H. & Camp, T. R. ('62) R-147
Czarnecki, R. B., Perriello, R. C. & Shook, W. M. ('62) R-333

Davis, D. S. ('58) R-384, R-385, R-387, ('59) R-186, R-193, R-472, R-491, ('61) R-490, R-499, ('62) R-431, R-432
Davis, E. T. ('58) R-67
Day, Ray ('58) R-357
Dawson, John P. ('59) R-159
DeBoer, Lloyd & Larson, T. E. ('61) R-226
Delaney, John E., Grasso, Rosario J. & McCarthy, Joseph A. ('61) R-426
DeRuiter, H. ('60) R-263
Diehl, C. H. ('62) R-191
Dong, G., Giusti, R. L. & Greenberg, A. E. ('58) R-382
Drautz, K. E. & Backmeyer, D. ('62) R-315
DuBois, F. P. & Howells, D. H. ('60) R-240
Dunstan, G. H. & Hindin, E. ('60) R-299
Dyment, Robert ('61) R-22, ('62) R-364

Eaton, Thomas J. ('59) R-204
Ebert, D. W., Morris, R. L. & Cerny, Josephine ('61) R-102
Eckenfelder, W. W. Jr. ('61) R-340
Eckenfelder, W. W. Jr. & Barnhart, E. ('62) R-341
Eden, G. E. & Truesdale, G. A. ('61) R-285
Edgerly, E. Jr. & Ryckman, D. W. ('59) R-322
Ehrenfest, Paul ('62) R-346
Eikleberry, M. A. & Humphrey, S. B. ('62) R-142, R-176
Erganian, George K. ('61) R-19
Ettinger, M. B. & Rosen, A. A. ('59) R-230
Evans, G. R. & Boucher, P. L. ('62) R-184
Eye, J. D., Keshavan, K. & Reuter, L. H. ('61) R-55

Fair, Ernest W. ('61) R-16
Feeney, J. L., Ludwig, H. F. & Gram, A. S. ('62) R-213
Feng, T. H. ('62) R-328
Fiedler, R. A. & Fitch, E. B. ('60) R-394
Fifield, Charles W. & Schaufus, Charles P. ('59) R-123
Fitch, E. B. & Fielder, R. A. ('60) R-394
Fleming, J. R. ('60) R-282
Flentje, Martin E. & Hamilton, John J. ('59) R-112
Ford, D. J. ('59) R-188
Ford, R. G. ('62) R-12
Ford, R. V. ('58) R-183
Forman, L. & Annett, R. ('60) R-98
Franzini, Joseph B. ('61) R-138
Fuhrman, Ralph E. ('59) R-280
Fynn, George F. ('59) R-398

Gaffney, P. E. & Ingols, R. S. ('61) R-449
Galizia, F. J. ('62) R-380
Garrison, W. E. ('60) R-347
Garza, S. A., Sultenfuss, M. C. & Haneman, A. Jr. ('59) R-302
Gaufin, A. R., Jensen, L. & Nelson, T. ('62) R-227
Geinopolos, A., Katz, W. J. & Mancini, J. L. ('62) R-118
Geldreich, E. E., Clark, H. F. & Kabler, P. W. ('58) R-103
Geuther, Carl E. ('59) R-35
Giusti, R. L., Dong, G., & Greenberg, A. E. ('58) R-382
Goldstein, Alexander ('58) R-57
Gonglewski, N. ('60) R-91
Goodman, Brian L. ('61) R-438, R-466
Goodnight, Clarence J. & Whitley, L. S. ('61) R-284
Grady, H. R. & Lee, J. R. ('62) R-279
Gram, A. S., Feeney, J. L. & Ludwig, H. F. ('62) R-213
Grant, W. ('58) R-22, R-111
Grasso, Rosario J., McCarthy, Joseph A. & Delaney, John E. ('61) R-426
Greenberg, A. E., Dong, G., & Giusti, R. L. ('58) R-382
Greer, H. G. ('58) R-28
Groves, B. S. ('60) R-374
Grune, W. N. ('61) R-445, ('62) R-411, R-423
Grune, W. N., Hughes, R. B. & Thompson, T. L. ('62) R-81
Gunderson, N. E. ('61) R-127
Gurnham, C. F. ('60) R-368

Hadjilcannou, T. P. & Malmstadt, H. V. ('60) R-385
Halvorson, H. O. ('58) R-316
Hamilton, John J. & Flentje, Martin E. ('59) R-112
Hampton, P. E. ('58) R-321
Haneman, A. Jr. & Garza, S. A. ('59) R-302
Harleman, D. R. ('60) R-407
Harper, Allen D. ('59) R-21
Hart, Russell W. & Butrico, Frank A. ('61) R-290
Hartmann, F. W., Lollich, M. F. & Chanin, G. ('62) R-406
Haskett, J. F. & Henry, J. L. ('58) R-233
Hatch, A. E. ('61) R-50
Hatch, A. E. Jr. & Chamberlain, W. H. ('58) R-173
Hauenstein, Henry W. ('61) R-333
Hazey, G. & Hudson, H. C. ('60) R-199
Healy, Edward R. ('61) R-17
Heath, William A. ('59) R-136
Henderson, W. L. ('61) R-443
Henry, J. L. & Haskett, J. F. ('58) R-233
Heukelekian, H. & Isenberg, E. ('60) R-95
Heywood, Robert P. ('59) R-30
Hindin, E. & Dunstan, G. H. ('60) R-299
Hirsch, A. A. ('58) R-83, ('60) R-90, ('61) R-469, R-470
Hirsch, Phil ('61) R-155
Holcomb, A. E. ('60) R-359
Holyoke, D. ('60) R-156
Hoper, C. H. ('60) R-15
Hoppert, C. A., Anwar, R. A. & Byerrum, R. U. ('61) R-152
Hornung, James ('61) R-200
Howells, D. H. & DuBois, F. Q. ('60) R-240
Howland, W. E. ('58) R-379
Howson, Louis R. ('60) R-11
Hudson, Herbert E. & Hazey, G. ('59) R-261, ('60) R-199
Hughes, R. B., Thompson, T. L. & Grune, W. N. ('62) R-81
Humphrey, S. B. & Eikleberry, M. A. ('62) R-142, R-176
Hurwitz, L. E. ('62) R-356
Huy, H. M. ('58) R-389
Hylton, J. L. ('58) R-107

Ince, Frank G. ('59) R-20
Ingols, R. S. & Gaffney, P. E. ('61) R-449
Ingram, William T. ('61) R-158
Isenberg, E. & Heukelekian, H. ('60) R-95

Jackson, J. O. ('58) R-155
Jaffee, T. ('58) R-227, R-288, R-343, ('59) R-332, R-443
Jenkins, K. H. & Thoman, John R. ('60) R-261
Jensen, L., Nelson, T. & Gaufin, A. R. ('62) R-227
Jones, R. H. & Kehoe, T. J. ('61) R-61

Kabler, P. W., Clark, H. F. & Geldreich, E. E. ('58) R-103
Kally, E. ('62) R-48
Karassik, Igor J. ('61) R-238, R-246, R-249, R-254, R-260
Kaser, Kent S. ('61) R-303
Katz, W. J., Geinopolos, A. & Mancini, J. L. ('62) R-118
Keefer, C. E. ('58) R-261, ('60) R-41, R-336
Keefer, C. E. & Becker, H. S. ('61) R-396

Kehoe, T. J. & Jones, R. H. ('61) R-61
Kenmir, R. C. ('58) R-43
Kendall, N. J. ('61) R-234
Keller, Arthur G. ('59) R-107
Keshavan, K., Eye, J. D. & Reuter, L. H. ('61) R-55
Kidder, R. J. ('62) R-404
Kiess, F. & Schreckegast, C. ('60) R-318
Kiker, Jr., John E. ('59) R-13
Kimmel, A. L. ('59) R-125
King, Richard & Montell, Bert S. ('59) R-196
Kinney, J. E. ('61) R-11, ('62) R-19
Kirkendall, W. E. ('60) R-84
Knowlton, Kenneth F. & Babcock, R. H. ('60) R-76
Kolln, William ('62) R-182
Kountz, R. R. ('58) R-287
Kramer, H. P. & Kroner, R. C. ('60) R-100
Krawczyk, D. ('60) R-91
Kroner, R. C. & Kramer, H. P. ('60) R-100
Kristy, O. M. ('60) R-204

Laberge, R. H. ('60) R-228
Lackey, James B. ('61) R-281
LaDue, Wendell R. ('59) R-16
Lamon, Clarence D. ('58) R-162
Langford, L. L. ('59) R-372, ('61) R-353
Langworthy, V. W. ('58) R-209, ('59) R-106, R-223, ('60) R-67
Larson, T. E. & DeBoer, Lloyd ('61) R-226
Laubusch, Edmund Jr. ('59) R-95, R-234, R-350 R-473, ('60) R-172, ('61) R-216, R-220
Learned, A. P. ('58) R-15
Lee, J. R., & Grady, H. B. ('62) R-279
Lemberg, Wayne E. ('59) R-15
Leopold, W. R. ('60) R-342
Lieber, Maxim ('61) R-123
Lindsay, Norman, Riddick, Thomas M. & Tomasio, Antonio ('59) R-209
Linsley, S. E. & Mick, K. L. ('58) R-327
Livingston, L. E. Jr. ('58) R-390, ('59) R-459, R-487
Livingstone, F. C. ('61) R-293
Lohmeyer, George T. ('58) R-281
Lollich, M. F., Channin, G., & Hartmann, F. W. ('62) R-406
Lordley, H. E. ('58) R-229
Loveless, Compere ('58) R-369
Lucas, E. G. ('60) R-80
Ludwig, H. F., Gram, A. S. & Feeney, J. L. ('62) R-213
Ludwig, H. F., & Stewart, M. J. ('62) R-297
Lyon, F. D. ('61) R-409

MacGonagle, F. R. ('60) R-160
McCarthy, J. A. ('62) R-392
McCarthy, Joseph A., Delaney, John E. & Grasso, Rosario J. ('61) R-426
McCauley, R. F. ('61) R-80
McCauley, R. F. & Raths, C. H. ('62) R-238
McFarland, S. W. ('60) R-19
McGauhey, P. H. ('58) R-241
McKee, C. W. ('61) R-165
McKinney, R. E. ('60) R-273
McKinnie, M. ('60) R-309
McPherson ('62) R-53
McPherson, M. B. & Radziul, J. V. ('60) R-121

Mallman, W. L. ('62) R-400
Mallman, W. L. & Peabody, F. R. ('61) R-432, ('62) R-427
Malmstadt, H. V. ('60) R-380, R-385
Mancini, J. L., Katz, W. J., & Geinopolos, A. ('62) R-118
Maynard, S. B. ('61) R-202
Medkeff, R. J. ('62) R-23
Meeker, J. M. ('58) R-97
Merz, R. C. ('60) R-293
Metziger, Max C. ('59) R-275
Mick, K. L. & Linsely, S. E. ('58) R-327
Miller, E. F. ('59) R-252
Miller, Frank H. ('58) R-313
Miller, L. M. ('60) R-107
Miller, W. T. ('58) R-135
Mills, D. A. ('62) R-283
Montell, Bert S. & King, Richard ('59) R-196
Montgomery, James M. ('59) R-78
Morgan, Philip F. & Neuspiel, Peter J. ('59) R-368
Morris, R. L. ('59) R-133, ('62) R-138
Morris, R. L., Cerny, Josephine & Ebert, D. W. ('61) R-102
Morrison, W. S. & Thompson, J. ('60) R-186
Moses, Thomas W. ('59) R-33
Munroe, H. F. ('60) R-73, ('62) R-195
Murdock, Jr., John H. ('58) R-12, R-31
Murphy, K. L. & Rohlick, G. A. ('61) R-211
Murray, R. ('58) R-127
Murray, W. B. ('60) R-61, ('61) R-28
Myers, A. L. ('61) R-47
Myers, J. W. ('58) R-123
Myren, Richard T. & Barlow, John P. ('61) R-296

Navone, R. ('60) R-402, ('62) R-423
Nelson, T., Gaufin, A. R. & Jensen, L. ('62) R-227
Nester, Norman W. ('59) R-432
Neuspiel, Peter F. & Morgan, Philip F. ('59) R-368
Nicholson, H. P. ('60) R-224
Nordell, Eskel ('58) R-222
Nusbaum, Isadore ('59) R-119

Ockershausen, R. W. ('58) R-89
Oldaker, Warren H. ('61) R-87
Ollvier, Gordon E. ('61) R-105
Oppenheimer, C. H., Travis, N. B. & Woodfin, H. W. ('62) R-250
Owen, C. E. ('61) R-65
Owen, M. B. ('60) R-328

Palin, A. T. ('61) R-458, ('62) R-425
Pardee, L. A. & Studley, E. G. ('58) R-247
Parkhurst, J. D. ('60) R-234
Peabody, F. R. & Mallman, W. L. ('61) R-432, ('62) R-427
Perriello, R. C., Shook, W. N. & Czarnecki, R. B. ('62) R-333
Pfeiffer, Willard P. ('59) R-389
Phillips, Max B. ('61) R-301
Pipes, Wesley O. Jr. ('61) R-328
Pomeroy, R. D. ('61) R-311, R-474
Porges, R. ('58) R-116
Post, Nicholas ('60) R-377
Powell, Sheppard T. ('59) R-138
Purdy, R. W. ('62) R-233

Radziul, J. V. & McPherson, M. B. ('60) R-121
Rand, M. C., Heukeleklian, H. & Mueller, P. K. ('60) R-389
Raths, C. H. & McCauley, R. F. ('62) R-238
Raviv, Chaim ('61) R-477
Reid, George W. & Assenzo, Joseph R. ('61) R-316
Reuter, L. H., Eye, J. D. & Keshavan, K. ('61) R-55
Rhame, George A. ('61) R-467
Riddick, Thomas M., Lindsay, Norman & Tomasi, Antonio ('59) R-209
Ritter, Jr., Leo J. ('59) R-454
Roe, Frank C. ('58) R-191
Rohlick, G. A. & Murphy, K. L. ('61) R-211
Rosen, A. A. & Ettinger, M. B. ('59) R-230
Ross, Elmer E. ('59) R-364
Roth, S. I. ('58) R-17
Rowntree, J. B. ('62) R-368
Ruff, R. J. & Ullrich, A. H. ('60) R-246
Ryckman, D. W. & Edgerley E. Jr. ('59) R-322
Rynders, Arthur ('59) R-175

Scanlon, A. J. ('58) R-338
Schaphorst, W. F. ('58) R-161, R-393
Schaufus, Charles P. & Fifield, Charles W. ('59) R-123
Schmidt, O. J. ('60) R-397
Schneider, George ('59) R-116
Schrader, G. P. ('60) R-369
Schreckegast, C. & Kiess, F. ('60) R-318
Schulze, K. L. ('60) R-211, R-256
Schwenk, Henry C. ('59) R-201
Seeger, W. R. & Walsh, F. F. ('60) R-137
Shannon, A. M. ('61) R-205
Shook, W. M., Czarnecki, R. B. & Perriello, R. C. ('62) R-333
Sigworth, E. A. ('58) R-201
Simon, R. E. ('58) R-347
Singleton, Kelsie B. ('59) R-400
Sirman, John M. ('61) R-485
Smelser, O. E. ('62) R-89
Smet, Harold ('58) R-364
Smith, Alden ('58) R-369
Smith, J. B. ('58) R-340
Smith, J. E. & Thayer, R. C. ('58) R-53
Sopp, G. C. ('60) R-37
Sortor, Charles H. ('59) R-428
South, William T. ('59) R-396
Spade, J. F. ('62) R-350
Sparr, A. E. ('58) R-295
Stevenson, Robert E. ('61) R-348
Stewart, M. J. & Ludwig, H. F. ('62) R-303
Straub, George H. ('61) R-402
Streans, Donald E. ('59) R-141
Strudgeon, George ('59) R-314
Studley, E. G. ('61) R-308
Studley, E. G. & Pardee, L. A. ('58) R-247
Sultenfuss, M. C. & Garza, S. A. ('59) R-302
Symons, George E. ('58) R-3, R-9

Tarrant, J. ('61) R-482
Taylor, D. M. ('58) R-351
Taylor, E. F. ('60) R-25
Thayer, R. C. & Smith, J. E. ('58) R-53
Thoman, John R. & Jenkins, K. N. ('59) R-128, R-288, ('60) R-261
Thomas, H. A. Jr., Coulter, J. B. & Bendixen, T. W. ('60) R-215
Thomas, G. E. ('61) R-411
Thompson, J. & Morrison, W. S. ('60) R-186
Thompson, T. C., Hughes, R. B. & Grune, W. N. ('62) R-81
Thompson, Pat ('59) R-318
Tims, W. C. ('61) R-346
Tomasi, Antonio & Riddick, Thomas M. ('59) R-209
Tong, Annabel ('60) R-428, ('61) R-491
Travis, N. B., Woodfin, H. W. & Oppenheimer, C. H. ('62) R-250
Trubnick, E. ('60) R-287
Truesdale, G. A. & Eden, G. E. ('61) R-285
Tuepker, J. L. ('62) R-170

Ullrich, A. H. & Ruff, R. J. ('60) R-246

Vaseen, V. A. ('61) R-390
Vaughn, James C. ('61) R-207
Veelker, P. L. ('60) R-50
Volpe, A. ('60) R-353

Walsh, F. F. & Seeger, W. R. ('60) R-137
Walter, Leo ('62) R-288
Watson, K. S. & Clark, C. M. ('62) R-310
Weaver, P. J. ('61) R-117
West, B. W. ('62) R-331
West, G. ('60) R-192
Welsh, George W. Jr. ('59) R-94
Whitaker, Mark B. ('59) R-43
Whitcomb, C. F. Jr. ('62) R-25, R-29, R-37
Whitley, L. S. & Godnight, Clarence J. ('61) R-284
Wilging, R. C. ('62) R-264
Williams, Clyde E. ('59) R-161
Williams, J. S. ('58) R-69
Wilson, R. N. ('60) R-46
Winefordner, J. D. & Malmstadt, H. V. ('60) R-380
Wolman, Abel ('59) R-10, ('61) R-97
Wood, J. W. ('58) R-255
Woodfin, H. W., Oppenheimer, C. H. & Travis, N. B. ('62) R-250
Wyss, O. ('62) R-155

Zablatsky, H. R. & Cornish, M. S. ('60) R-268
Ziemke, Paul C. ('59) R-47, R-185, R-242